

On the peripherals side, the 3330 Model 1 disk was reduced from \$178 to \$170 MMC, the Model 2 went from \$105 down to \$100 and the 2305 Model 1 disk from \$533 to \$480.



EDITORIAL

Editor E. Drake Lundell Jr.
Deputy Editor Ronald A. Frank
Managing Editor Nancy French
Associate Editor Donald Leavitt

Washington Bureau/
Chief

Staff Writers

Edith Holmes
Catherine Arnst
Jeffrey Beeler
Marcia Blumenthal
Howard Karten
Timothy J. Scannell
Brad Schultz
Marguerite Zientara
Cheryl M. Gelb
Barbara T. VanScoyoc
Gail Cohen

Photography Editor

Editorial Assistant

Editorial Cartoonist

Contributors:

Education J. Daniel Couger
Legal Roy N. Freed
Taylor Reports Alan Taylor
Human Connection Jack Stone

SALES

Vice-President

Advertising

Administrator

Display Advertising

Classified Advertising

Sales Promotion

Director

Market Research

CIRCULATION

Vice-President

Circulation Manager

Customer Service Rep

Assistant

PRODUCTION

Vice-President

Supervisor

Assistant Manager

Typesetting Supervisor

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718. **England:** Roger Frampton, Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. **W. Germany:** Hans-Jürgen Ballnath, Computerworld, c/o CW Publikationen, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 34-90-61. Telex: 5215350. **Asia:** Hidetsuna Sasaki, Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.—\$18 a year; Canada and PUAS—\$28 a year; Europe and Near East—\$75 a year; all other foreign—\$125 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/

Publisher

President

VP-Marketing

VP-Finance

VP-Circulation

VP-Production

Patrick J. McGovern

W. Walter Boyd

Roy Einreinhofer

William P. Murphy

Margaret Phelan

Lee Vidmer



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Law Expected by Summer's End

House Unit OKs \$50 EFT Liability

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The House Banking Committee has unanimously approved a bill limiting customer liability in banks' electronic funds transfer (EFT) systems to \$50, except in cases of fraud or negligence. The Senate Banking Committee approved a similar measure in late April.

At present, there is no federal limit on an individual's liability for unauthorized use of electronic banking facilities, although some states and some banks have set limits.

House Banking Committee Chairman Henry Reuss (D-Wis.) attributed consumers' slowness in accepting EFT to the fact that "there weren't federal laws protecting consumers from losing their life savings through fraud or some foul-up in the electronic systems." Reuss predicted the bill would become law by the end of the summer.

In addition to EFT, the legislation

covers such electronic banking services as telephone bill paying, pre-authorized bill payments and the direct deposit of salaries into accounts. It applies to commercial banks, mutual savings banks, savings and loan associations and credit unions.

Under the bill, the consumer would not be protected if the loss were part of a fraudulent scheme in which he participated or if he failed to notify the bank "within a reasonable time" after his EFT access card was lost or stolen.

The consumer also would not be protected if he disclosed his personal identifying number (PIN), kept it with the card or wrote it on the card.

The bill would require financial institutions to correct all bank errors within 10 days of notification under most circumstances. It would bar banks from sending unsolicited access cards to individuals unless the card required an individual's written approval in order to work.

Financial institutions would be required to disclose terms and provide transactions receipt.

Further, the bill would make an institution liable for damages to an individual that resulted from the institution's failure to make a requested electronic transaction, such as paying a bill. The institution would not be held to this provision, however, if the transaction did not occur because of "technical malfunction caused by circumstances beyond its control."

Access to Account Data

The bill would assure that information about a customer's electronic transactions could be disclosed only:

- To the account holder.
- To another person who is a party to the transfer of funds when the information is necessary to effect or correct the transfer.
- To communicate the terms and history of a credit transaction as defined in the Truth-In-Lending Act for a consumer reporting agency.
- To a person authorized by law to have access to the records of financial institutions in the course of his duties.
- Pursuant to a court order.
- Pursuant to the express written authorization of the account holder for a particular purpose.

The bill's chief sponsor, Rep. Frank Annunzio (D.-Ill.), hailed it as "charting new waters." However, some of the bill's most controversial provisions — allowing individuals to reverse a cash transfer — was deleted in committee.

A spokesman for the American Bankers Association (ABA) said that from its point of view, only one minor problem remains with the legislation. The ABA disapproves of a provision stating that no seller may charge more for goods and services paid for by check than by EFT.

"When a financial institution charges less for an EFT transaction, it is simply a case of the financial institution passing on its savings to the consumer," the spokesman said.

Jury Still Debating Fate Of Memorex vs. IBM Case

By Catherine Arnst
CW Staff

SAN FRANCISCO — After two weeks of deliberations, the jury charged with deciding IBM's guilt or innocence in Memorex Corp.'s billion-dollar antitrust lawsuit against the firm still has not reached a verdict.

The six women and five men have been sitting from 9 a.m. to 5:30 p.m. with a 15-minute break each day since June 8 [CW, June 19], and apparently they have spent most of that time going over the 20,000-page transcript accumulated in the five months of trial.

At the start of the deliberations, the jury made a request for a blackboard, which was granted, and a dictionary, which was denied.

Early last week the jury asked its first question, which concerned Judge Sa-

muel Conti's instruction about determining the intent of a firm to monopolize an industry. Intent is at the heart of the second hurdle the jury must cross to reach a decision, according to Conti's instructions, and the question could signify that jury members are halfway to making a decision.

However, the jury foreman did say members of the jury had reached very few agreements so far when Conti asked for a progress report June 19. He added that they are moving "very slowly," implying it would be a minimum of another five days before any verdict could be expected.

Memorex is suing IBM for \$306,580,000 on grounds it monopolized the computer industry. If Memorex wins, any damages the jury awards it will be tripled.

On the Inside This Week

NEWS

- Students' Conviction for Theft Held Unlikely 4
- DP Service Theft Case to Test Canadian Code 5
- Informatics Meet Promises Hot Political Debate 6
- Service Lowers Odds in Federal Oil Lottery 7
- More Americans Fearing Loss of Privacy 8
- Professor Looks at EFT and 'Quality of Life' 10
- Many Lessees Underinsured, Report Cautions 11
- User Suit Charges Univac With Trade Restraint 12
- Revamp Team Faults Federal DP Management 13
- Agricultural Pests Up Against New Enemy: DP 14
- DPS Planning Recovery Operations Centers 15
- Federal Board Passes Rules on Teller Machines 16

IN DEPTH

- IBM Leasing: Optimizing Your Cash Flow 19-21

EDITORIAL

- Editorial: Communications Bill of '78 22
- Human Connection: Listen to Users 23
- Taylor Report: Insurance Covers Malpractice 23

SOFTWARE & SERVICES

- CIS Cobol Extensions Aid Small Sites 25
- Secure/IMS' Guards Against TP Accesses 26
- Interdata Users Offered Multifunction Accounting 28
- DBMS Impact Seen Unexpected by Managers 32

COMMUNICATIONS

- Net Process Boosts Interface Options 39
- Portable Unit Prints 136 Columns 40
- Atlantic Research Adds Remote Control Switch 41
- NCR Adds POS System for Fast-Food Shops 44

SYSTEMS & PERIPHERALS

- No Real DDP Systems Seen Being Sold 49
- Data 100 Extends Options for Data Entry 51
- Interactive Graphics Unit Runs With 360, 370 52

MINIWORLD

- Randal Link 200 Additions Boast More Power 53
- Ampex Core Add-On Now Fits Eclipses 54
- Mini Helps Machine Supplier Double Its Size 55
- Mini Provides Firm Support for Floor Maker 58

MICROCOMPUTING

- Futurdata Aids 6802, 6805 Development 59
- Users of 6800-Type MPUs Get Industrial Basic 60

COMPUTER INDUSTRY

- Services to Grow 17%/Year Through '82 61
- Time Seen Ripe to Start New Technology Firm 61
- IBM Series/1 Shipments Seen Peaking in 1980 62
- Japan's 10-Year Effort in DP 'Extraordinary' 63
- PCC Chief Sees Billion-Dollar Personal Marts 64

'ADR's LOOK[®]

**spots
problems
in time
to take
action'**

— Kenneth J. Panzarella, Vice President
Information Services Division, Carte Blanche



**"ROSCOE[®] gives Carte Blanche
a competitive edge in attracting
blue chip clients and programmers."**

"Our division is now an independent profit center, serving outside clients, in addition to meeting the internal needs of Carte Blanche. In our business, lost time quickly means lost revenue. To prevent that, our operations group uses LOOK throughout the day to see what is in the computer, what resources are being used, and what jobs are waiting to be processed. LOOK lets us see where the inefficiencies are and take corrective action," Mr. Kenneth Panzarella commented.

"We really don't know how much it would cost us if we didn't have LOOK, because it shows us things that are just starting to happen. With LOOK, we can stop and change before serious time losses occur. We are sure that LOOK has paid for itself many times over."

"We needed a programming system which would allow us to work efficiently at remote client locations," Mr. Panzarella continued. "We looked at ROSCOE—as well as competing systems. After comparing cost, productivity gains, and CPU overhead requirements, we chose ROSCOE."

"ROSCOE's on-line programming capabilities allow our programmers to work at peak efficiency regardless of location. Our programmers are happier and they have a higher degree of professionalism. It keeps costs down and makes us more competitive. ROSCOE has increased our ability to do a better job for both our service bureau customers and Carte Blanche. We're positive we made the right choice."

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

For more information on what ADR software can do for you, call or write:



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS[™]

Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100

ADR software products: in use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. International offices in Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Puerto Rico, Republic of South Africa, Singapore, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



Students' Conviction for Theft Held Unlikely

By Brad Schultz

CW Staff

TORONTO — The three former University of Alberta (UA) students who stand accused of "stealing" telecommunications services for allegedly setting up unauthorized computer accounts on a university computer system will probably not be convicted, according to Canadian computer law expert Daniel Cooper.

Section 287 of the Canadian federal criminal code, under which they have been charged, is addressed to the "theft of telecommunications services" and has never before been used to prosecute cases of alleged computer abuse, Cooper indicated.

The "mischief" charge, brought under Section 387 of the code, is a vaguely defined term which can only apply in this matter if computer time can be considered "property," Cooper explained.

Section 287 defines telecommunications as "any transmission, emission or reception of signs, signals, writing, images, sounds or intelligence of any nature by radio, visual, electronic or other electromagnetic system."

Theft of telecommunications occurs, according to 287, when anyone "fraudulently, maliciously or without color of right abstracts, consumes or uses electricity or gas, or causes it to be wasted or diverted, or uses any telecommunications facility or obtains any telecommunications service."

'Stealing' Telecommunications

If the defendants used CRTs linked via phone lines to the Amdahl 470 in the course of their alleged access, then under 287 they have "stolen" telecommunications, according to the Toronto attorney.

"But that is hardly the relevant part of what they did," Cooper said, adding "the value of the transmission facility [or telephone medium] would have been less than \$200, which makes them punishable only by summary conviction."

"I don't think that 'stealing time' is really caught by this section . . . The intent [of 287] is to help Bell Canada

and the other telecommunications carriers with 'blue box' setups," he said. "Blue boxes" are devices used to operate telephones in a clandestine manner to avoid billing.

"I think there is only a very remote possibility that they will be convicted under that section," Cooper said.

Under Section 387, anyone commits "mischief" who "willfully destroys or damages property; renders property dangerous, useless, inoperative or ineffective; obstructs, interrupts or interferes with the lawful use, enjoyment or operation of property; or obstructs, interrupts or interferes with any persons in the lawful use, enjoyment or operation of property."

"Our jurisprudence is not terribly clear on what 'property' means, but it

would probably have to be something fairly tangible," Cooper said, adding "computer time per se would probably not be property unless the judge were awfully creative."

Cooper indicated that other criminal code sections might have been applied in this case — such as 338, the fraud section, or 361, which addresses impersonation.

However, these alternatives may have been rejected by the prosecution since the UA abuse did not involve embezzlement or misuse of an account under the name of some innocent party, he speculated.

"My personal opinion has been that the theft of computer time alone is not a crime, unfortunately," Cooper said.

The trial will apparently focus not on

what the students allegedly did but on what to call what they did, Cooper indicated, adding their intent — purportedly "playing" rather than making money — seems of little import in view of the law cited by the prosecution.

Intent has in the past been a critical factor in deciding some Canadian computer abuse cases involving unauthorized disclosure of confidential data [CW, May 29].

Computer law experts agree the trial of the three ex-students, slated to begin in Edmonton, Alberta, this December, will set a precedent in Canadian law. The trial may also show that the law as it now stands cannot handle most kinds of computer abuse in Canada and may suggest similar inadequacies in U.S. jurisprudence as well.

Senate Urged to Revise DP Crime Bill

(Continued from Page 1)

Chickering & Gregory.

S. 1766 also needs much exposure in order to give those in the computer field time to alter many of their current practices and to give the judicial system the opportunity to prepare for enforcement and prosecution of cases under a computer crime law, Parker said.

If S. 1766 were passed by Congress in the near future, it would make criminals of many honest and dedicated computer personnel, he stated. Anyone in the field who follows the common practice of making unauthorized use of computers for such activities as playing games, printing Snoopy calendars, calculating bowling scores and maintaining church mailing lists could be charged with a felony under the law as it is currently drafted, Parker warned.

These acts would no longer be ethical issues, winked at by management, but federal crimes punishable by up to 15 years in prison and \$50,000 in fines, the consultant said.

Another time-honored practice that will be unacceptable should this bill become law, he added, is the belief of many programmers that as the authors

of their programs, they have the right to trade, give away or make personal use of those programs even though their employers' resources were used in their development.

"These concepts and practices ingrained in the computer field will have to be drastically and quickly changed to ensure that the proposed law will start its life with respect and in an absence of gross and pervasive violation," Parker stated. "This will require a period of time for intensive exposure of the concepts in this bill in trade literature, professional society and trade association meetings, discussions and debates to swing practice in line with proposed law."

Licensing Opposed

Both Parker and Nycum, his co-investigator in a now eight-year-old National Science Foundation effort to study computer crime, expressed their hope that the proposed law will not lead too rapidly to the development of licensing and certification for computer systems or practitioners.

"I am totally opposed to [licensing and certification] at this time due to the lack of standards in this new and radically changing industry and discipline," Nycum told the subcommittee.

From a strictly academic analysis of existing federal laws used in the past to prosecute computer crimes, Nycum believes most unauthorized acts against or involving computers are already illegal. But what is theoretically possible isn't always practical for a prosecuting or defense attorney faced with applying federal laws against wire and mail fraud to a case filled with new and complex technological facts, she said.

While legislation that would make certain actions involving computers a crime is "very desirable" at the federal level, such laws are "very necessary" in the states, particularly in cases involving the theft of computer programs or the misappropriation of computer time — cases in which it is difficult to prove that something "tangible" has been stolen or misused, Nycum added.

The attorney identified a number of cases that the bill, as it is presently worded, would not cover. Among these are civil rights and discrimination cases in which, for example, a computer program is used to screen out minorities and those instances

where information, data or programs are taken but not used.

Law Enforcement Fear

For its part, the law enforcement community, represented at the hearings by the Department of Justice and the Federal Bureau of Investigation, supports the Ribicoff legislation as a powerful investigation tool that will see much use in efforts to combat sophisticated white-collar crime, but fears that the proposed law would cover violations of nearly every computer system in the country.

"It would be impossible for the FBI, armed with this legislation, to enter the field of computer fraud in a wholesale fashion with our current investigative resources," according to special agent Joseph F. Henahan, chief of the FBI's white-collar crime section in its Criminal Investigative Division. Even with an increase in resources to go after computer-related crimes, close cooperation with and help from state and local authorities would be required to guard against duplication of effort and failure to investigate a case.

Training Problem

The FBI would also be faced with a serious training challenge, given the need for technical expertise in handling computer fraud matters, Henahan added.

Similarly, John C. Keeney, acting assistant attorney general for the Justice Department's Criminal Division, said the department "has no interest in prosecuting every computer fraud and abuse case occurring in the U.S."

But the Justice Department does believe federal jurisdiction in computer crime matters should be broad and concurrent with state authority, Keeney said. Without "a compelling federal interest," the department would defer most investigations and prosecutions of computer crimes to the states and localities, he suggested.

While no less than 40 federal statutes can be applied to such crimes — not one of which was designed with computer-related fraud and abuse in mind — their success in a courtroom is particularly uncertain, Keeney stated. "In our view, a specific statute would achieve a greater deterrent effect than existing criminal statutes which may, through strained interpretations, be available for prosecution purposes," he said.

1960 payroll?

It's not easy trying to run half-astute, retread 1960 payroll, personnel packages on a 370 . . .

Wang users don't have the problem. Wang payroll/personnel/ERISA software is specifically designed for whatever 360/370 OS, DOS, VS, IMS environment you have . . .

For more, just call Joe Nestor (617) 851-4111, Wang Laboratories, Inc., Lowell, MA. 01851.

WANG

May Not Cover Computer Abuse DP Service Theft Case to Test Canadian Code

By Brad Schultz
CW Staff

EDMONTON, Alta. — Canadians may discover their criminal code does not apply to most computer abuse cases when three former University of Alberta (UA) students stand trial here in December for allegedly issuing themselves unauthorized accounts on the main UA computer system.

The three have been charged with stealing "telecommunications services" — a federal offense — for allegedly accessing UA's Amdahl Corp. 470V/6 mainframe through CRT terminals linked over telephone lines.

Canada's criminal code has no section devoted to computer abuse, except in the area of privacy law. In handling most computer-abuse cases, Crown prosecutors must therefore apply such broadly stated sections as those that pertain to "theft" of telecommunications services, fraud and even misuse of energy resources.

So, while the three face possible 10-year prison terms, a number of legal experts consider conviction unlikely, largely because they doubt current Canadian law applies to the case — at least in the way it is being interpreted by the Canadian Attorney General's office. But none doubt the case will set a precedent in that nation's jurisprudence, whatever the outcome.

The defendants are charged with theft of telecommunications services under a criminal code section written, in the opinion of informed sources, to deter use of a telephone in a way that precludes billing. They are also charged, under another section, with "mischief," which is defined as interference with "the lawful use, enjoyment or operation of property."

Early last year, the three "bypassed the normal protection mechanisms" on the university's 470 in order to "play with it," according to UA computing service professor, Anthony Marsland, who knows all three individuals.

"They weren't selling their time or their knowledge on the side, or anything like that, but they were, in the last stages [of their activity], interfering with the operation of the computer," Marsland said.

The level of security on the 470-driven Michigan Terminal System (MTS) at UA — the "workhorse of the campus" with about 200 terminals connected — was especially low at the time.

Techniques Well-Known

Intrusion techniques were common knowledge among a number of UA students, having been developed by undergraduate and graduate computing science majors as faculty-approved projects, Marsland continued.

The three individuals who are now defendants — one a full-time engineering major, since graduated, and the other two part-time "fringe" students — derived a rough sense of these techniques from conversations with computing science students and succeeded in applying them through a process of experimentation, he said.

They logged on in a normal way, gave themselves a privileged status on the system and reserved portions of memory for their own use, Marsland

said, adding they were able to give themselves unissued accounts on the system by altering its accounting records.

Since UA grade transcripts are stored on a separate computer system, the possibility of changing such records could not even have been considered by the students, he indicated.

A number of security breaches have been detected at UA's MTS since 1976, and at the time of this particular alleged abuse a "loop protection mechanism" was already on order. It was installed last January, Marsland said.

Considered similar to an installation at Rensselaer Polytechnic Institute in Troy, N.Y., UA's MTS features about

5M bytes of memory, IBM 3350 disk units, a high-speed paging drum and a "large number" of magnetic tape drives, he noted.

Attempted Violations

Ironically enough, some of Marsland's "most promising" students have been trying to violate the new protection in order to better understand it. Although setting up unauthorized accounts is forbidden, UA's computing science faculty views student attempts at simply penetrating system security as an expedient in trying to understand the nature of data base software.

"Really, I am concerned with en-

suring that computer systems are as secure as possible. And one way to do that is to determine what [their] weaknesses and deficiencies are," Marsland said.

The matter at hand is not properly a judicial concern and it is not clear whether the facilities involved may truly be called "telecommunications," Marsland observed.

The defendants "would certainly deserve having the book thrown at them" if they had been motivated by monetary profit in their alleged activities, he declared, but said that since this was not the case, any punitive action against the individuals should only be decided by university officials.

DOS LEAPS AHEAD OF OS THANKS TO SPACE/MANAGER

Well, almost

At last, DOS/VS users can keep the low core, low overhead and high efficiency of DOS/VS while enjoying the powerful capabilities of OS file and space management.

SPACE/MANAGER installs in two minutes with no impact on existing operations — not even an IPL. SPACE/MANAGER will immediately start providing these significant benefits:

□ **Reduced Operations Time** — full job stream management, partition independent JCL, and automatic job set-up will speed turnaround and reduce reruns.

□ **Improved Efficiency** — fully automatic assignment of optimized file locations, volume balancing and volume priority concepts greatly reduce channel contention and arm movement, thereby speeding throughput.

□ **Reduced Space Requirements** — By pooling every partition's space requirements, using only the minimum space, and reclaiming all unused space, SPACE/MANAGER users often save 30%-70% of disk space.

□ **Improved Reliability And Security** — A comprehensive hierarchical security system, complete file retention management and cross-partition file protection vastly improve the users security and control.

□ **Reduced Programming Efforts** — Elimination of EXTENT and ASSGN cards, plus simple natural JCL, plus symbolic capabilities greatly simplify programming efforts.

□ **Expanded Capability** — An automatically maintained total-system catalog, comprehensive activity reports, automatic secondary space allocations, are just some of the system improvements provided by SPACE/MANAGER.

It's all there and it's only there with SPACE/MANAGER. While alternative systems provide limited subsets of these capabilities, SPACE/MANAGER has it all: comprehensive capabilities, incredible efficiency, unparalleled simplicity, complete documentation and outstanding local support from offices throughout the United States and Canada.

Call or write *altergo*, the industry leader, and let us prove our claims

Altergo Software Inc

40 William Street
Wellesley Office Park
Wellesley, Massachusetts 02181

Telephone: (617) 237-6132

Please send me information on

SPACE/MANAGER ☐ Also, send me information on
the Shadow II T.P. Monitor ☐

Name

Title

Organization

Address

Phone

Disk Type Number

Our need is ☐ immediate ☐ 3-6 months ☐ over 6 months

International Data at Issue

Informatics Meet Promises Hot Political Debate

TORREMOLINOS, Spain — The 10-day Intergovernmental Conference on Strategy and Policies for Informatics (Spin) promises to be one of the most political computer-related meetings of this year when it gets underway Aug. 28 [CW, April 17].

Jointly organized by the Intergovernmental Bureau for Informatics (IBI), based in Rome, the United Nations Educational, Scientific and Cultural Organization (Unesco) and the Spanish government, the meeting is expected to draw delegations from more than 80 countries both to the sunny beaches and to the hot political debates.

Less developed countries (LDC) will be heavily represented. More than 100 of these nations banded together at the UN Committee for Technical Assistance and Development (Unctad) meeting in Nairobi 18 months ago to demand more access to information held by the industrialized nations and they are sure to press those demands here.

The major Western power in the IBI organization that is putting the conference together is France, and other members include Algeria, Argentina, Bolivia, Brazil, Cameroon, Chile, Cuba, Equator (formerly French Equatorial Africa), Spain, Gabon, Ghana, Iraq, Iran, Israel, Italy, Jordan, the Malagasy Republic, Morocco, Mexico, Nigeria, Senegal, Swaziland, Tunisia and Zaire.

The U.S. is not a member — because "we don't support the pretensions of the organization," according to the State Department — but will send a "small" delegation to the conference and will present a paper on how three U.S. states have implemented computers and information systems.

Because of the heavy LDC orientation of the conference, there is expected to be a hot debate over the access to information in Western data banks, sources indicate, and conflicts

between the less and more developed countries over information policy are expected to dominate the meeting.

A preview of such debates will take place within IBI itself in July when the contract of the present director-general, Fermin A. Bernasconi, comes up for renewal. While he is backed by the French — who contribute 30% of the IBI budget — there will be two other candidates for the job, one backed by the South American members and another backed by the Middle Eastern countries, led by Marxist-oriented Iraq.

Either of these candidates would be

expected to take the organization into an anti-American stance, sources indicated, adding, however, that France can probably round up the votes for its candidate.

For the conference, the IBI General Assembly has set the following topics for consideration:

- Accelerating the transfer and application of computer/communications technology to developing countries.

- Initiating programs in all countries for indigenous capabilities in information resources.

- Encouraging developing countries to take a more active role in formulating

international data transmission policies.

- Integrating informatics with major national educational, industrial, communications and social policies.

- Recognizing the power of informatics in affecting national sovereignty and democratic control over the destinies of nations.

The conference may come out with an agenda for the establishment of a new world information order, and at least one U.S. executive has predicted that "if there is an information war coming, some of the first volleys may be fired" at the meeting here.

U.S.-Funded Net Would Serve LDCs

(Continued from Page 1)

might be a hot topic of conversation at this summer's LDC-dominated Spin meetings.

Satellite Network

Under the proposal, a worldwide satellite network might be established to provide high-volume, low-cost information links between the LDCs and the U.S., State Department officials said. A variation of this proposal would include regional networks, possibly in Latin America or Africa, linked separately to the U.S.

Either plan would be subsidized by the U.S.

In the LDCs themselves, the U.S. would also subsidize terminal facilities, probably located either in the U.S. Information Agency offices in those countries or in the government agencies making the most use of the services, according to proposals under consideration.

Furthermore, the government would subsidize access to the publicly available data bases in the U.S. and would maintain catalogs of data base material available from U.S. private sources.

However, the government would not

subsidize the use of these private files by LDCs, instead leaving it to the country in question to work out a contract with the private firms involved.

Barriers to Effective Use

The U.S. government is "very much interested" in helping LDCs gain ac-

This story was developed by Rex Malik, a British freelance journalist in London, and E. Drake Lundell Jr. of the CW staff in the U.S.

cess to information in U.S. data bases, one official said, but he noted several problems that need to be overcome before that information can be used effectively.

Along with this, there is a great need for training of personnel in the LDCs, he added.

To date, the U.S. has been working to help fill these needs primarily through UN organizations, he said.

On the UN Secretariat level, for example, the U.S. has sponsored a proposal for a technical information exchange network.

Furthermore, there is an Industry, Technology and Information Bureau in the UN Industrial Development Organization (Unido) which is sponsoring a four-pronged, 18-month to two-year project in training LDCs to use existing data bases and exploring ways to tailor those data bases more to the needs of the LDCs.

Controversy Likely

However, when and if the U.S. makes its formal offer to underwrite the communications and terminal costs for such a system, the sparks are sure to fly.

Europeans are increasingly concerned about data that is flowing out of their countries and into U.S. data banks and many countries are currently studying ways to slow this transborder data flow, particularly in the area of information about private citizens.

Most European governments would not sit idly by and watch the U.S. in turn spread this information around the world, some Western European sources indicated.

In addition, the European governments would oppose such an idea on the grounds that it would lock the users in the developing countries into U.S. data bases and technology, thereby foreclosing that opportunity to Western European computer firms and data base suppliers, which are largely government supported.

Communist Bloc Reaction

Furthermore, the reaction from the communist bloc countries could also be expected to be negative, sources said, since they might see the move as an attempt to politically influence the LDCs in favor of the West.

In particular, some Third World countries, LDCs themselves, may charge that the U.S. proposal is a new form of economic imperialism designed to overwhelm the LDCs and their cultures.

Other LDCs that might favor the proposal in general might oppose some of its specifics, a U.S. source said. For example, the U.S. has developed large data bases on the resources of developing nations based on information gathered via remote sensing satellites, he said.

Already some of these countries have demanded that the U.S. turn such data over to them and that its dissemination to others be restricted, a State Department official said.

DIBOL®-11 Compatible Compiler for PDP®-11s

Now PDP-11 Users and OEMs can have a DIBOL-11 compatible compiler without having a DEC® Business Products Datasystem.

This compiler and run-time system runs on LSI-11s up to PDP 11/70s. The only software prerequisite is DEC's RT-11 operating system version 2C or later.

Single and multi-terminal versions of the run-time system are available. Under the multi-terminal version, BASIC, FORTRAN and MACRO can be run at the same time if desired.

Accounts Receivable with Sales Analysis, Accounts Payable, Payroll, General Ledger, Order Entry with Inventory Control, Fixed Assets and Depreciation, Accountant's Client Write-up, Professional Time and Billing and other proven accounting packages are available in DIBOL-11.

End User and OEM inquiries are invited.

MCBA

4929 Wilshire Blvd., #940
Los Angeles, CA 90010
(213) 936-7131

Picks Promising Land Parcels Service Lowers Odds in Federal Oil Lottery

By Tim Scannell
CW Staff

BEDFORD, Mass. — Each month, thousands of Americans, enticed by visions of financial independence, pay \$10 for a ticket in a government-operated lottery whose prizes could eventually net the winner more than \$100,000.

The raffle is conducted by the Department of Interior's Bureau of Land Management (BLM) and the prizes consist of oil and gas lease rights to federally owned land in the Rocky Mountain states. The BLM offers about 600 to 700 parcels of land every month and sells an average of approximately 2,400,000 tickets to hopeful participants each year.

Initiated in 1960, the lottery has given birth to several firms which, for a fee, will file a client's application and provide various services that might theoretically lower the odds against a participant. These services include obtaining the government's parcel list and procuring accurate geological reports.

One such company, Petrodata, Inc., uses two Digital Equipment Corp. PDP-11s to process and correlate the reams of data to isolate desirable parcels. The object of entering the lottery, according to Charles Adams, president of the firm, is not only to win a tract of land, but to win one containing a deposit of either gas or oil.

Petrodata was founded by Adams in 1974 and has been used principally by him and his family for personal speculation and parcel selection. "We started with the idea of looking for some clients, but we didn't actually begin actively soliciting them until a few months ago," he said.

"We're primarily interested in people who want to file a fair number of applications," Adams continued. "Somebody who wants to file a few cards a month has to think of it as strictly a lottery in which the chances of winning are not very high. However, people who are able to file 30, 50 or 100 or more per month can expect to win a drawing more often and can consider it more of an investment than a lottery-type gamble," he stated.

Winners in the federal contest are issued leases for each of the plots of land. The person pays the government a fee, usually \$1 an acre per year, and can hold the land for up to 10 years without starting any production or drilling activity, Adams said. After that time, the land reverts back to the lottery and the system repeats itself.

If, however, a speculator decides to drill on the winner's land, that person can retain the lease as long as there is commercial production going on.

Oil companies are usually interested in about one-fourth of the raffled parcels and, depending on their proximity to producing wells, will offer the lottery winners anywhere from \$3,000 to \$100,000 to obtain the drilling rights.

In addition to receiving payment from the oil or gas companies for the right to drill on a particular parcel of land, the winner is also entitled to royalties on any oil produced during exploration. Adams himself has been getting \$1,500 a month in payments from an oil company that has been leasing one of his plots since 1975.

The popularity of the government lotteries has increased over the years, Adams claimed, especially since the oil and gas companies have exhibited more interest in exploratory drilling. "Some of the parcels are so unpromising that they draw none or very, very few applicants," he pointed out, "while a few of them are so popular that they draw as many as 8,600 applicants."

That is why Adams, a former adviser on DP for Exxon Corp.'s Creole Petroleum Corp., believes it is important to consider such things as geological surveys and the number of drillings that have produced oil or gas. Without such information, which is public record, the odds against winning a desir-

able parcel are increased, Adams noted.

PDP-11s After Hours

The system is composed of two PDP-11s made available after hours by the Data Syntechs Corp., of which Adams is president. The configuration is used to compile all of the available information on each parcel offered by the BLM as well as the drilling and geological data, Adams explained.

The systems are also used by Adams to predict how many cards will be bought on each tract and how much the oil companies might be willing to pay the winner for the drilling rights.

Although the PDP-11s' assistance

helps to considerably lower the odds against the participant, Adams admitted that "you still tend to fly somewhat blind" in making selections. "There's no way of exactly knowing how much each parcel sold for or how many applicants each one drew," he noted. "Therefore, you can't see if you've picked the best ones" from the total number listed by the BLM.

There is, however, no guarantee that an oil company will buy the rights to a winner's tract of land. Drilling for oil is "a highly speculative, entrepreneurial area in general," Adams noted. "It costs anywhere from \$100,000 to \$1 million for someone just to drill the hole."

OPTIMIZER III. Because programmers need all the help they can get.

Already expanding COBOL productivity at 200+ sites.

OPTIMIZER III is a new program product from Capex that provides COBOL programmers the information they need to develop and maintain programs with less effort. Although it was just introduced in mid-March, OPTIMIZER III is already in use at over 200 sites. If you use any of the IBM OS, VS1, SVS or MVS systems, OPTIMIZER III can help you improve program quality, yet reduce programming time and effort. Here's how.

Easier Program Development.

OPTIMIZER III takes some of the mystery out of programming. It monitors program execution and provides verb-level execution counts showing exactly what the program does, what has been tested, and where problems exist. It even shows where CPU time is concentrated, to help focus tuning efforts. As a result, programs can be developed or modified faster, with less effort.

Faster Debugging.

By providing direct feedback about program operation, OPTIMIZER III helps spot otherwise hidden logic or performance problems. It actually flags

many logic errors automatically; numerous problems can be corrected before the program is ever executed.

If the program does fail, even if it is a production program, diagnostic information is provided in COBOL-oriented terms, virtually eliminating the need for cryptic, time-consuming hexadecimal dumps. There is even a testing feature that allows multiple program interrupts in a single run, so that fewer tests are required. Result: Debugging is faster and easier.

More Time for Programming.

With its powerful program analysis, debugging aids, and automatic program optimization, OPTIMIZER III allows programmers to concentrate on programming... helps them do more of what they do best.

Regardless what productivity tools you may be using, OPTIMIZER III can dramatically reduce the time and effort needed to produce and maintain your COBOL programs. To learn more, write, or call now (602) 264-7241.

CAPEX CORPORATION
Atlanta (404) 261-3553 • Boston (617) 329-6170
Chicago (312) 596-6550 • Dallas (214) 238-7191
Los Angeles (213) 923-9216 • New York (212) 262-8888 • Other offices worldwide.



Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004

Gentlemen:
Please send me more information
on OPTIMIZER III.

Name

Title

Company

Address

City

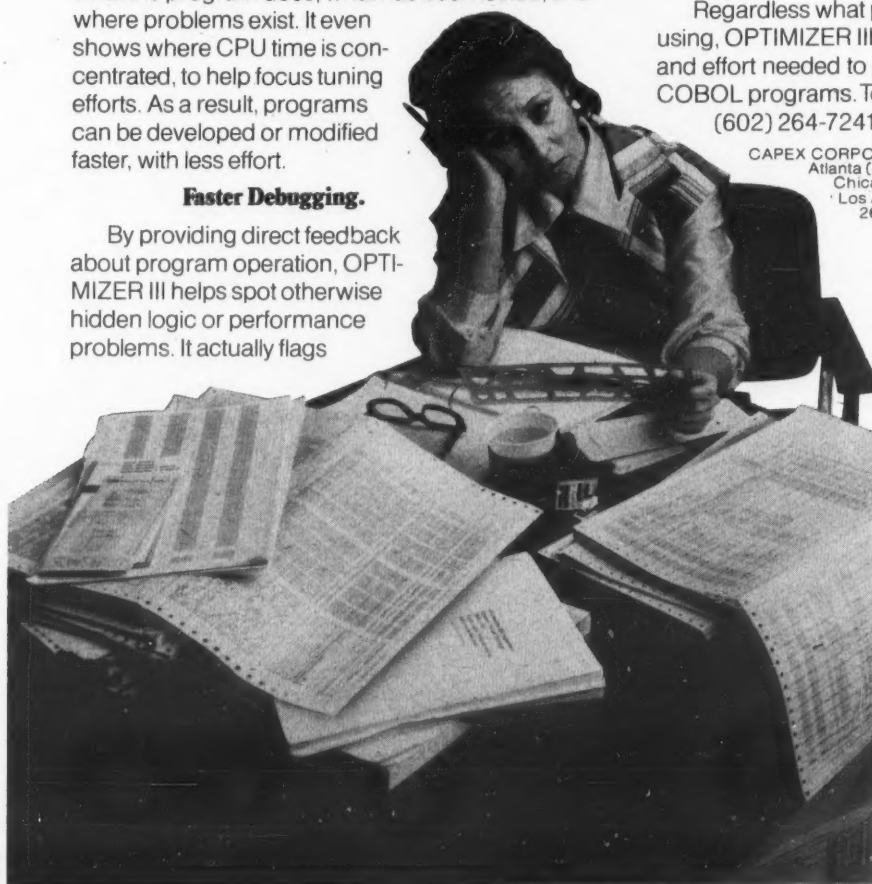
State Zip

Phone

Model

System ☐ MFT ☐ MVT ☐ VSI
☐ SVS ☐ MVS

CO



More Americans Fearing Loss of Privacy

NEW YORK — Seventy-one percent of Americans believe they "begin surrendering their privacy the day they open their first charge account, take out a loan, buy something on the installment plan or apply for a credit card," a recent Harris Survey found.

Sixty-seven percent felt that way last year [CW, May 2, 1977] and 48% in 1974.

A 61% majority said it believes "the Internal Revenue Service is not keeping individual tax returns confidential," and 62% called this practice a "very serious" invasion of privacy.

"Credit businesses are selling information about an individual's credit standing," 79% believe, and 60% see this as a "very serious" in-

vasion of privacy.

Wiretapping and electronic surveillance were of even greater concern, according to the Harris Survey of 1,458 U.S. adults. Of those surveyed, 85% believe "illegal wiretapping and other forms of electronic surveillance" are "probably" or "surely" going on in America today, and 82% see this as "very serious."

Other "invasions of privacy" American believe are now quite common include unsolicited phone calls selling products or services, unsolicited mail advertising products or services, personal questions by banks and loan companies in connection with loan applications and the use of the Social Security number as an identifier on various records.

Amdahl 'Assist' Package Puts MVS/SE Work on 470

(Continued from Page 1)

compatible — processor series, Amdahl's Assist is comparable in function to packages available from several IBM 360 leasing companies that allow those older machines to accept and work with standard IBM 370 instructions.

Introduced by IBM when the 3033 was announced in April 1977, MVS/SE — the "SE" stands for "System Extension" — has been described as providing significant enhancements to MVS systems by implementing several frequently used system routines in firmware. Without this SU, the MVS operating system cannot take advantage of the enhancement features built into the 30 series processors, according to one industry source.

In one test situation, the throughput

of an Amdahl 470 running with IBM's MVS/SE and Amdahl's Assist was substantially better than the throughput of a 470 using IBM's "standard" OS/MVS, but not quite up to the performance of MVS/SE running on an IBM Series 30 CPU, the IBM competitor acknowledged.

In the same test, supervisor state execution was similarly reduced on the Amdahl setting with Assist, but not to the extent it dropped when MVS/SE was used in its native Series 30 environment, the Amdahl spokesman said.

MVS/SE Assist is activated when an IBM 370 extended instruction is executed on a 470. An operation exception program check is intercepted by an MVS/SE Assist routine in front of the program check first-level interrupt handler and the Program Status Word (PSW) is analyzed to determine what operation has been requested.

MVS/SE normally replaces the interrupted instruction with a branch to an appropriate simulation routine, leaving the branch in place to avoid further program check interruption overhead, Amdahl said.

No Changes Needed

No changes in 470 hardware, in existing MVS/SE instructions or in any other programming are required to enable users to make a smooth transition to the MVS/SE environment on the Amdahl equipment, the spokesman said.

The Assist software is added to an MVS/SE system by performing a linkage edit of the system control program nucleus; no external operating considerations, turning parameters or linkage interfaces are involved, he noted.

MVS/SE Assist routines occupy about 1,500 bytes in the MVS nucleus, he added.

In a benchmark reported by Amdahl, the measured environment was a commercial batch jobstream running concurrently with 48 simulated, active users of IBM's Time Sharing Option (TSO); OS/MVS Release 3.7 was on an 470V/6-II with 8M bytes of real memory. All required MVS SUs were installed, including MVS/SE and RMF-11, the spokesman continued.

With IBM's Trace routine on, MVS/SE Assist provided a 13% reduction in supervisor state execution. System throughput capacity increased by 12%.

With Trace off, MVS/SE Assist provided an 11% reduction in supervisor state execution and a system throughput increase of 10%, he claimed.

Actual performance will vary with customer environment and system workload, the spokesman noted, adding that the performance improvements provided were meant simply as a "reasonable reference point."

IBM has released performance information on MVS/SE stating that the addition of the SU reduced supervisor state execution time by 20% to 27%, and improved uniprocessor throughput by 14% to 17%, apparently on a 3033 processor.

Amdahl's MVS/SE Assist will carry a monthly license fee of \$250. The basic MVS/SE SU costs another \$1,250/mo from IBM.

Amdahl is at 1250 E. Arques Ave., Sunnyvale, Calif.

Map Helps Cyclists Make Milestone Trip

(Continued from Page 1)

mathematics to a specific area when the altitudes of the terrain within that area are known, Schramko explained.

Cross-Section Produced

The computer uses this information to produce a cross-section of the ground contour in terms of altitude and distance. This data is then used to select impact and measuring-point locations for missile test firings so any point in the area, regardless of the altitude, is observable from at least one of the monitoring locations.

The computer and COM unit basically solve the problem of "where you put the explosion based on the fact that you only have a limited number of observation sites," Schramko said. Theoretically, if a straight line can be connected to two points along a plotted line without intersecting the contour line between the two points on the graph, the two points should be visible to each other by line-of-sight, he

added.

Schramko used a Univac 1110 mainframe at NWC, and an Information International, Inc. Comp-80 COM recorder to produce the maps for his cycling expedition. The Comp-80 was under the control of a specialized graphics package Disspla, developed by Integrated Software Systems Corp. The software enabled the scientists to transform statistical data from a series of numbers into readable charts and graphs.

Input Modified

In order to be processed by the CPU, the data that was input had to be modified to include some known cycling parameters. For instance, Schramko established through experimentation in earlier trips that approximately one pint of water is required for a cyclist to travel about 28 miles along gently rolling desert terrain. If the terrain has an uphill grade of 8%, for example, the distance the cyclist can travel using

one pint of water drops significantly, to about three miles.

With this information, the computer was able to schedule water stops for the trip according to the grades which would be encountered along the route. Since many of the stops did not coincide with water sources, water had to be left at the computer-selected stops in advance of the riders.

'Nothing Arbitrary'

"There is nothing really arbitrary that goes into the computer," Schramko pointed out. "It's digitized map information and that's all. Everything on the map is calculated and based on the digitized distance from starting point and elevation, and those are the only input to the program."

Besides mapping distance and contours, Schramko pointed to other uses for the COM unit and specialized software. "For instance, we are presently drilling for geothermal steam here at the NWC to be used as a source of energy. We've taken a lot of readings and would like to plot those readings against such variables as distance and area."

"Eventually, we'd like to get a graphic contour of the earth's temperature, 100 feet below the surface level," he said.

Map Available

The map produced by the computer for Schramko's expedition was made available to cyclists who last month participated in a two-day, 99-mile race sanctioned by the U.S. Cycling Federation. The event, which involved traveling over part of the route traversed by Schramko and Kratzke, covered approximately 100 miles from the northern boundary of Death Valley to a campground at the Mt. Whitney Portal.

Although Schramko's cycling trip did have a scientific purpose — to debug and verify the accuracy of the computer output — the primary motivation was a personal desire for accomplishment. "The trip was undertaken just to see if it could be done," Schramko remarked.

If anyone else wants to see if it can be done, the map is available from the Lone Pine Chamber of Commerce, P.O. Box 552, Lone Pine, Calif. 93545.

A Multi-Tech acoustic data coupler is the best you can buy.



A strong statement, with some strong reasons. The Multi-Tech acoustic coupler has crystal-controlled circuits, acoustic cups that are rock and tight-fitting, a rugged construction that's meant to last, and more. In other words, its design is very, very good.

We then take our good design one step further. . . we build our couplers to be reliable. Our quality assurance program includes long burn-in, exhaustive test-checkout, thorough inspection, and pride; because a slap-'em-together and ship 'em manufacturer will not produce reliable acoustic couplers.

Our prices are competitive, and we have distributors and service centers nationwide. So, why not go with the best.

MULTI-TECH SYSTEMS, INC.

82 SECOND AVENUE S.E. • NEW BRIGHTON, MINN. 55112 • (612) 631-3550

We also manufacture 300 and 1200 bps hard-wired modems and test equipment. Call us collect for the name of the distributor nearest you.

BDS has a Dataproducts line printer for *HP* users.

HP-3000
HP-2000
HP-21MX
HP-1000

Hewlett Packard Users! If you are up-grading your printer, or in the process of ordering an H-P computer, let BDS supply your printer needs. We offer the *full speed-range* of Dataproducts printers for all listed H-P systems. And our pricing assures you of appreciable dollar savings.

There are absolutely no conversion problems. We supply the printer, controller and cable. You simply plug the controller into the CPU.

When you buy a Dataproducts printer from BDS you buy more than just a printer. You get economy, efficiency, promptness and reliability.

Economy—BDS prices offer an attractive price/performance alternative to the limited and expensive H-P offering.

Efficiency—Our full H-P compatibility enables you to *really* plug in and go. We offer the complete speed range so you may match the right printer to print load.

Promptness—BDS delivers in 30-45 days.

Reliability—As the largest supplier of Dataproducts printers to the end-user and system houses, we have delivered hundreds of printers to hundreds of satisfied users. More than 50,000 Dataproducts printers are in daily use throughout the world.

MORE FOR LESS? I LIKE IT!

The computer system I use _____

My line printing requirements are _____

Name _____

Title _____

Company _____

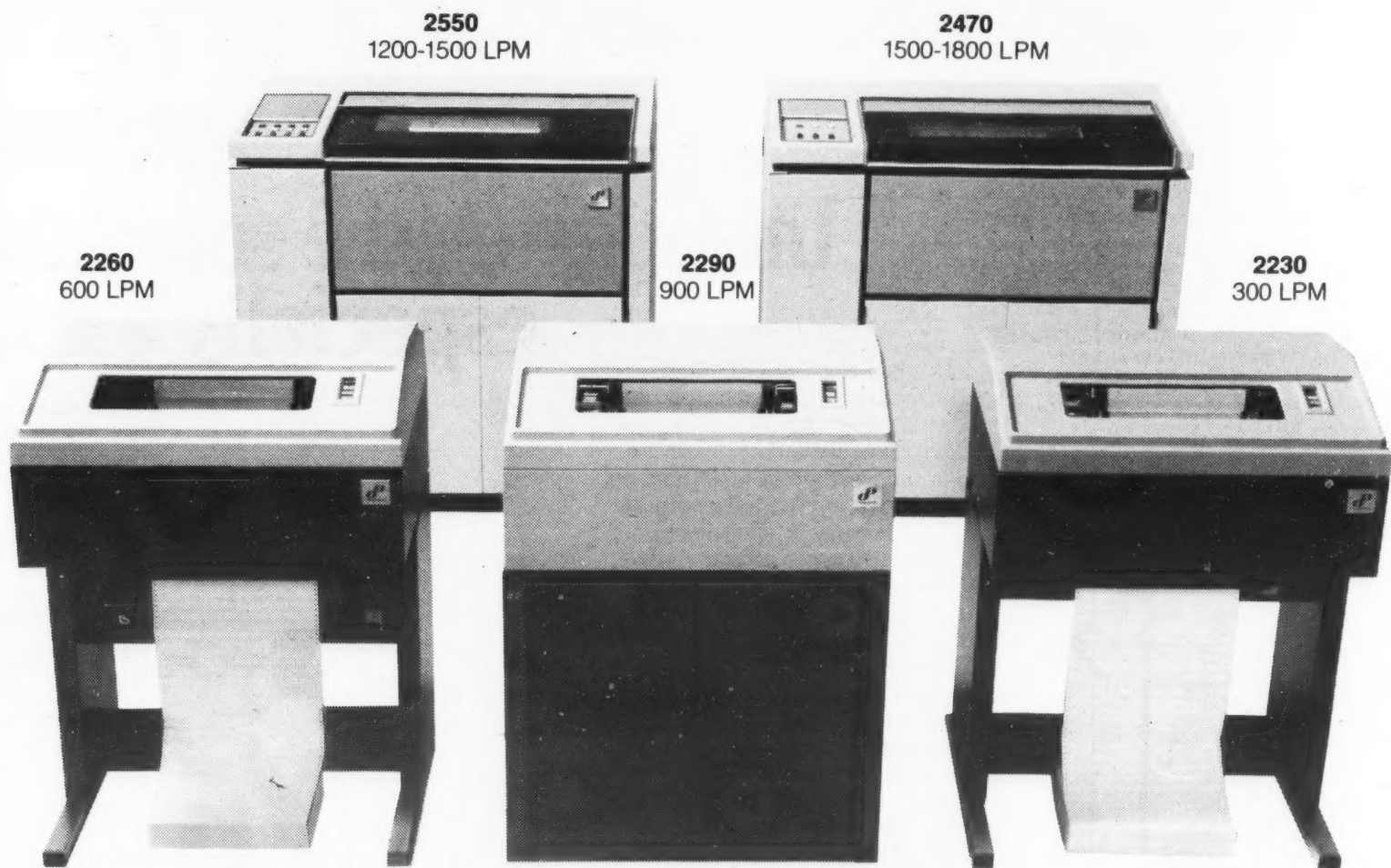
Street _____

City _____ State/Zip _____

Telephone () _____ Ext. _____

BDS

BDS Computer Corporation
 1149 Chestnut Street
 Menlo Park, CA 94025
 (415) 326-2115



**BDS Corporation, 1149 Chestnut Street
 Menlo Park, CA 94025, (415) 326-2115**

Boston 617-232-1744, Dallas 214-748-5207, Denver 303-825-3058, Des Moines 515-243-8646, Ft. Lauderdale 305-564-1744, Kansas City 913-371-8128, Los Angeles 213-613-0768, Nashua 603-880-4040, Newport Beach 714-759-1553, Oklahoma City 405-236-2931, Orlando 305-422-5678, Phoenix 602-258-9092, Portland 503-281-8462, Salt Lake City 801-355-7086, San Diego 714-231-1156, Seattle 206-282-6839

Professor Looks at EFT and 'Quality of Life'

By a CW Staff Writer
ANAHEIM, Calif. — How will electronic funds transfer systems now under development affect the "quality of life"?

This question was addressed at a recent conference here by Dr. Rob Kling, assistant professor of information and computer sciences at the University of California at Irvine.

According to Kling, who based most of his presentation on a study performed by E. Gerson in 1976, the quality of life for an individual depends on his relative power in the social setting in which he functions as well as his relative social resources and satisfactions.

In order to consider the influences of alternative EFT arrangements upon the quality of social and institutional life, Kling examined their effect on six different aspects of social settings, including opportunities; ecology, or the extent to which EFT saves or consumes nonrenewable resources; and coordination, or the extent to which EFT affects the ease with which an individual can manage his activities in all settings.

Kling also looked at intelligibility — or the extent to which participants can understand social, organizational or technical arrangements; dependency, the extent to which one can live without EFT should it "fail" us; and agency, the extent to which someone can influence the social, organizational or technical arrangements in force.

Increased Opportunity

Kling noted that increases in "opportunity" are the *raison d'être* of EFT. However, while EFT may bring financial services to people who otherwise wouldn't have them, EFT could also make possible "abusive surveillance and harassment" of unpopular political groups, for example.

In discussing "intelligibility," Kling noted that EFT can simplify or complicate specific transactions and financial contracts and can alter the demands made upon people to understand available products. "EFT systems become less coherent as they increase in versatility, scale and the extent to which they are coupled," Kling said.

To the extent that EFT systems replace current means of payment, Kling said, they will become more and more likely to entail hardship if they fail, as when power failed in the Northeast in 1965. In general, the larger the scale, versatility and accessibility, and the less costly EFT becomes, the more

likely we are to depend on it, he said.

EFT systems can influence the control of either individuals or EFT-using institutions, Kling said. "While it may be easy to dicker credit with a small shop owner, EFT accessed through large institutions means one loses control over his financial arrangements," he said. Additionally, proposals for EFT systems usually neglect such things as stop-payment mechanisms that exist in current checking systems.

In the area of "ecology," Kling noted that some current EFT arrangements are used by banks to increase the volume of financial transactions. Ironically, a side effect of some "paperless" EFT systems is a net increase in the amount of paper flowing through the banking system, Kling said. Also, ris-

ing energy prices may shift the relative attractiveness of EFT services to traditional alternatives.

Requires Less Effort

Discussing "coordination," Kling said that in general, "people can spend less effort coordinating their lives in a society that depends on a large variety of EFT-related services to the extent that they lead to greater intelligibility, control and less dependency for people."

Kling concluded by listing areas needing further study. He said the market structure of firms using and providing EFT systems should be examined to determine which systems foster increased concentration among a

few firms and which support a diverse array of small businesses. Important social costs should be identified and ways should be developed to internalize them into pricing schemes for EFT systems.

If social costs cannot be internalized into EFT pricing, he said, the industry should determine how to best inform the public about what they are. It should examine the structural role of consumers relative to EFT-providing institutions. It should understand which EFT arrangements are most consistent with a low-growth, rather than high-growth, economy, he said.

Finally, he urged that the industry learn how to develop EFT technologies so they are easy to roll back, if necessary, without major social upset.

Front panel accessibility — All the normally used operator controls are organized into functional groups and logically arranged for maximum operator convenience.

Baud rate switch — Switch from 110, 150, or 300 baud to 600 or 1200 baud transmission easily. Just flip the convenient switch and the terminal easily adapts to your communication speeds.

Introducing the smart daisy especially for the

It's called the Sprint 5. And it's from Qume.

That's right. Qume.

We've established quite a reputation in the word processing business. A reputation for letter quality print. And because of that, we didn't want to simply attach a keyboard to a printer and present it to the computer industry as a full blown terminal.

So we designed our Sprint 5 daisywheel terminal from the ground up to meet the needs of the computer industry. Complete with our famous print quality. And 55 cps speed.

Qume's smart microprocessor gives the Sprint 5 many capabilities not found in conventional terminals. Such as a powerful command set, self-diagnostics, memory storage of tab settings, and forms control programs.

Comprehensive command set — 59 powerful user oriented commands provide format flexibility. And to make it even easier, commands are printed on the keycaps.

Interchangeable character sets — We have over 50 different character sets and typestyles. They're easy to change and include international characters, AFL, and scientific symbols.

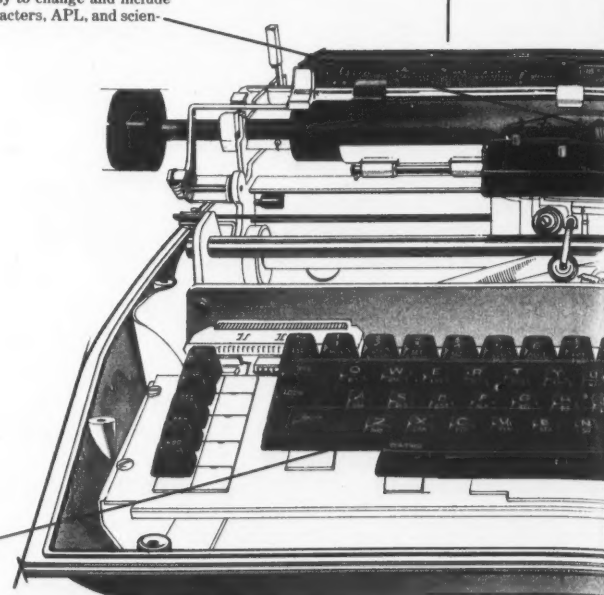
Smart microprocessor logic — You get flexible character spacing, precise plotting resolution, and smart multi-direction carriage slewing. Not to mention high quality printing. Fast.

OMSI PASCAL™-1
for LSI-11 through PDP-11/70 \$1500



Call (503) 226-7760 for a free demonstration

Oregon
Software inc.
2340 SW Canyon Road
Portland, Oregon 97201



Replacement Gear Not Covered

Many Lessees Underinsured, Report Cautions

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Many users of leased computer hardware do not carry enough insurance to cover termination of the lease and replacement of the equipment if the leased gear were to be destroyed by natural catastrophe, a computer negotiations report has warned.

And to add insult to possible economic disaster, "full, adequate coverage" can be obtained for only "slightly more" than what lessees tend to pay for inadequate coverage, according to *CNReport*, Volume 2, Issue 2.

Users often obtain disaster insurance from the lessor, rather than from an in-

surance company. They are convinced the lessor — as a specialist in computer sales — can buy the policy for less and thus pass on the savings, the report indicated.

The price for this coverage is typically expressed in the lease schedule as a decimal multiplier of the monthly lease payment, the report said.

A user may not realize until after its computer facility has been gutted by a flash fire that under terms of the lease it must continue making all payments and must provide replacement equipment, the report explained.

The only possible "out" in this predicament is for the user to pay a full "termination value" specified in the

lease agreement — a large sum that is not matched by the insurance coverage.

"The insurance procured by the lessor does not even name your company as an 'insured' or an 'additional insured' under the policy," *CNReport* said, explaining "the primary 'insured' named is the bank that furnished the senior debt financing for the hardware." Other insureds are "the equity investors in the leased hardware and the lessor himself," the report added.

Not Insured Against Causes

The user's policy may insure against the results of disaster, but not against the causes. For example, computer

fires are typically caused by short circuits or other electrical mishaps, the report noted, but disaster insurance may not cover the "blow-out" of components that precipitated a fire.

Hence, the policy may apply to damage that resulted from a fire without applying to the lost and very expensive components that were the fire's source.

CNReport advised users acquiring insurance on third-party leased hardware to determine the liability of all concerned in the event a disaster strikes and ensure that the lease contains a termination value as a possible "out."

It also urged users to obtain a number of bids on specified coverage from a personal broker and carefully compare these bids.

If coverage by the lessor seems unwarranted, users should obtain the prospective policy and premium quotation before signing the lease and should carefully evaluate coverage amounts and exclusions, *CNReport* said.

If the lessor is to furnish the insurance, the lessee should try to delete any lease provisions that excuse the lessor from any liability to provide adequate insurance coverage, the newsletter said, adding that the lessee should be named as an additional insured under the policy, with payment as the lessee's interest may be evident.

In addition, the newsletter urged users to be sure the insurance cannot be cancelled without 30 days' advance notice to the lessee and to seek advice from legal counsel and insurance experts on all aspects of the prospective coverage.

If the lessor is to furnish the insurance, the lessee should receive copies of the policy, all premium notices and evidence of premium payment. In addition, the choice of the insurance carrier should be subject to lessee approval, and the lessee should be allowed to supply the insurance through its own carrier, *CNReport* said.

CNReport is published monthly by International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Twintellect™ option — Want to use a special printwheel? Just switch on Twintellect when you install the printwheel. Sprint 5 electronics provide the coordination between code and print characters. Available only from Qume.

Dynamic positioning — Create graphs or justify your text easily. With switch selectable 10 or 12 characters per inch spacing. Plus controlled spacing of 1/32" horizontal and 1/48" vertical.

wheel terminal designed computer industry.

Serial or parallel interface — Sprint 5's can provide a standard serial RS232C interface to your system. In addition, the keyboard version is available with DC current loop interface, and the printer version is available with DC current loop or parallel interface.

Multicolor ribbons — over 15 different ribbons (10 color choices) to color your messages. Easy to handle cartridges with carbon or fabric multicolor ribbons.

Self test — Internal self-diagnostic routines can be initiated from the keyboard or from remote sites.

Surprisingly enough, however, the Sprint 5 costs no more than competitive terminals.

Obviously, a product that does much more but costs no more is a better buy.

And when all is said and done, that may be Sprint 5's most outstanding advantage.

For further information on how the Sprint 5 can give your computer letter quality output, contact: Qume Corporation, 2323 Industrial Parkway West, Hayward, CA 94545 or phone Lee Cannon, (415) 783-6100, Extension 338.

Qume®
the printed word



STOP

**DON'T BUY
A COMPUTER
UNLESS YOU CAN
AFFORD THE LOSS
GET THE REAL LOW
DOWN**

Take an inside look at the major microcomputer manufacturers and their difficulties before you buy a system that will not perform as advertised. Learn what to do for software as most manufacturers do not have any that's dependable. All of this and more is packed in the new book, "SO YOU WANT TO BUY A COMPUTER". Available through

SCIENTIFIC RESEARCH
P.O. Box 49009
Key Biscayne, FL 33149
\$4.50 softbound add \$1.00 for UPS Shipping
NO P.O. Boxes
C.O.D. or Bankcard orders phone (800) 327-6543

Maintenance Contracts at Issue User Suit Charges Univac With Trade Restraint

By Howard A. Karlen
CW Staff

NEW YORK CITY — Robert Heller Associates, Inc., a management consulting concern here, has filed a lawsuit against Univac, charging the Blue Bell, Pa., computer manufacturer with

activities in restraint of trade under the Sherman Antitrust Act.

The suit, filed recently in the U.S. District Court for the Southern District of New York, alleges that in negotiating renewal of equipment leases and maintenance contracts, Univac

forced Heller against its will to execute maintenance contracts on all the equipment. Heller said the previous owner of the equipment, New York University (NYU), had a contract with Univac that exempted two pieces of equipment, the CPU and an I/O channel expander, from the maintenance contract.

Heller has also charged it was subject to the economic dominance of Univac since its ability to keep its customers and attract new ones requires uninterrupted operation of its computer facilities. Because replacement of the Univac equipment by a third party would have required lengthy delays, Heller had no alternative except to continue

to rely on Univac, the user said.

NYU had an arrangement with Univac under which it was charged on a time-and-materials basis for maintenance of the equipment, instead of a monthly maintenance agreement with fixed monthly charges, according to the lawsuit. Forcing Heller to sign maintenance agreements for all the equipment as a condition of renewing the lease for the hardware was a violation of Section 1 of the Sherman Act, Heller has claimed.

Under the provisions of the act, Heller is seeking treble damages and attorneys' fees. Univac has until July 5 to answer the suit.

D.C. Fighting Bus Crime With Mini-Based Tracking

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — In response to an increasing number of crimes against bus drivers and passengers, the Metropolitan Transit Authority here recently instituted a computerized bus tracking system to help pinpoint the location of a bus when its driver activates a radio-controlled, silent alarm connected to the central control office.

When a bus driver activates the alarm, the bus' identification number is automatically transmitted via two-way radio to a Digital Equipment Corp. PDP-11/35 minicomputer. In memory, the bus' identification number accesses the bus' transportation assignment for that day and is compared to the "checkpoint file," which pinpoints where a bus should be at a particular moment if it is on schedule.

A console operator, working at one of eight TEC, Inc. Datascreen 415 CRTs in the divisional offices, sees on the screen the bus identification number, the bus' transportation assignment and the geographical point where the bus should be if it is on schedule, according to Joseph Greenway, head of the transit authority's Systems Maintenance Division.

The central control office then calls the Police Department, which dispatches personnel to the scene of the incident.

"If the bus is off schedule, the program doesn't work as well, but it still works," according to Marilyn McGinty, spokeswoman for the Metropolitan Transit Authority.

In setting up the system, 85,000 cards had to be punched with the district's bus schedules. There are 750 bus routes in the district and as many as 1,650 buses can be in service.

Even though the silent alarm equipment was installed a year ago, the task of punching the schedule cards was a "back burner item," done "when the operator could get to it," according to Greenway. Daily updating of bus assignments is done via the divisional CRTs, a task that takes "an hour or so," he added.

The complete system, including radios, costs \$5 million to install. Greenway said so far he is "very pleased" with the system.



"It's been done."

T-SHIRTS

Posters,
Memo Pads,
Sweatshirts, and
General Nonsense...

Free Brochure...25
cents

THE INCREDIBLE
SYSTEMS & T-SHIRT
COMPANY
Box 2623
Menlo Park, CA 94025

Revamp Team Faults Federal DP Management

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — President Carter either needs to put the "M" back in "OMB" — the Office of Management and Budget — or establish a new agency that would focus primarily on management planning and policies for the entire executive branch, according to the President's DP reorganization team assigned to review DP and communications in the departments of Justice and Treasury.

"The absence of consistent management practices in the federal government is the major cause of most of the problems with information resources" and with the use of the computer and communications technologies on which these resources depend, the

general government team said.

Without better management procedures and practices, the Justice and Treasury departments can't improve their use of these technologies, the study team concluded.

In addition, the team's draft report stated that management and technical assistance needs to be available to the several departments and agencies on a much broader and more standard scale. Ideally, this assistance would be independent from the day-to-day operations and control of such departments as Treasury and Justice so that candid, unbiased advice could be given.

Relatively few agency managers know how to direct an assessment of their needs in the context of a long-

term information system or to evaluate this technology on the basis of their agency's mission requirements, the reorganization team found.

Boosting Assistance

Management and technical assistance could be expanded by increasing the staffs, resources and visibility of such existing facilities as the Federal Computer Performance Evaluation and Simulation Center and the U.S. Navy Cobol Center. These organizations could be reorganized in a "revitalized" Institute for Computer Sciences and Technology at the National Bureau of Standards (NBS), or at each of the Cabinet-level departments.

Whatever strategy is adopted, "a commitment is needed to expand the

quality, quantity and types of assistance — whether provided by the government directly or purchased commercially or both — and to place a much greater emphasis on the need for managers and users within the agencies to take advantage of this assistance," the draft report stated.

The general government team also called on Carter to implement the Brooks Act more fully. That law — which split the central responsibility for effective management of federal DP among OMB, NBS and the General Services Administration (GSA) — should not be changed, according to the reorganization team. Rather, "the burden remains within the executive branch to provide the leadership necessary to improve information resource management," the team said.

Since the Brooks Act was passed by Congress in 1965, the federal government has been faced with the need to bring information resources under management control. Congress has lost confidence in the executive branch's ability to manage these resources and their underlying technologies, and more agencies and congressional committees have become "intimately" involved in the details of individual agency proposals for computer system upgrades or replacements, the draft report noted.

Individual managers with responsibility for an agency's tasks or mission have little real authority for acquiring the DP and communications tools they need, the team found.

'Overcontrol of Technology'

This "overcontrol of information technology has led to a system of management by red tape in which persistence, luck and pseudo-illegalities count as much or more than logic and reason," the reorganization group concluded.

The Justice Department's Federal Bureau of Investigation has run into these problems in its effort to upgrade its National Crime Information Center, and the Treasury Department's Internal Revenue Service has been forced back to the drawing board as a result of criticisms of its proposed Tax Administration System, for example.

Many agency managers simply ignore this procurement system or they bend its rules. But others have become "gun-shy" about even attempting computer system upgrades, the reorganization team said.

The general government group's draft report also highlighted the problem of hardware, software and people obsolescence in the Justice and Treasury departments. By failing to replace worn-out hardware, departments and agencies throughout the government keep their programmers busy patching systems rather than employing state-of-the-art programming skills and software.

The decreasing cost of hardware contrasts sharply with the higher costs of software and people, the team noted, and yet the government continues to be preoccupied with equipment.

Few appointed senior government officials remain agency heads very long — the average tenure is between 18 and 22 months — leading to an inability to relate political goals and priorities to the career staff responsible for information services, the team stated.

Chances are, your computer problem has also been solved.

Call us today at 800-225-9384.

Tell us what your computer automation or information processing problem is. Chances are, there's already a solution. And we can find it.

Every day, people ask us for help with their computer problems. And we're able to put each one in contact with an average of four companies that market solutions built around our computers.

This shouldn't come as a big surprise. Right now there are over 60,000 problem-solving systems built around our computers. They're working hard doing just about everything — blood typing, laser scanning, color formulation, portfolio identification, injection molding, sausage stuffing — you name it.

Write on your letterhead or call 800-225-9384 (in Massachusetts, call 617-493-2562) and tell us what your problem is. We'll tell you if there's already a solution. We'll also put you in touch with the companies that have it. And we'll check back with you later to make sure you were able to get together with them.

So let us know what you want to do.

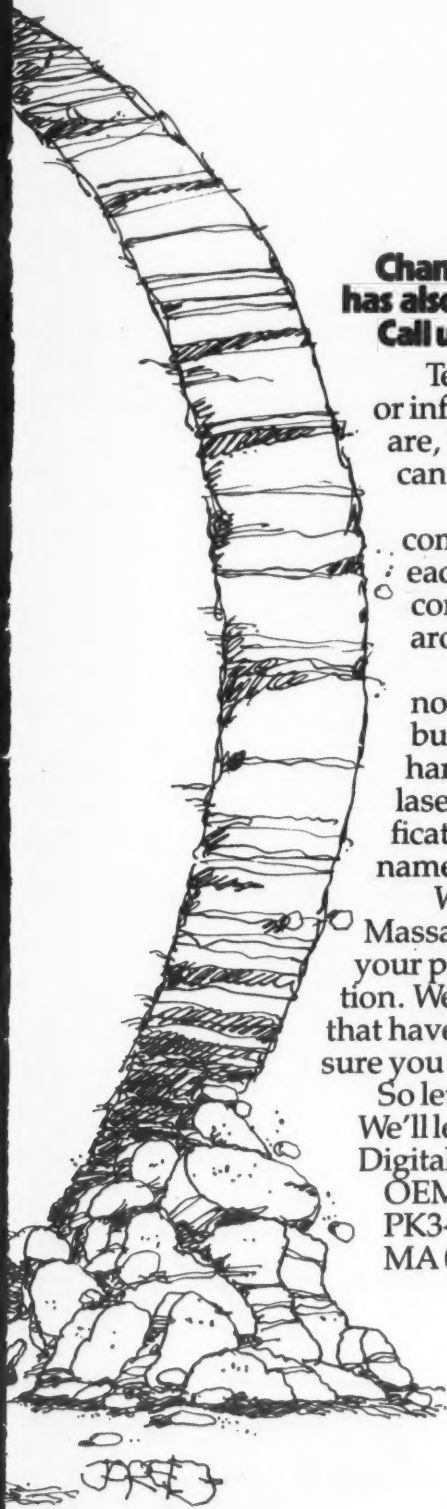
We'll let you know if it's already been done.

Digital Equipment Corporation,

OEM Referral Center.

PK3-1/M-28, Maynard,
MA 01754.

digital
OEM PRODUCTS GROUP



Agricultural Pests Up Against New Enemy: DP

By Marguerite Zientara
CW Staff

FRESNO, Calif. — Computers are becoming the new "farmer's friend" in the age-old battle against insect pests. Because of the rising costs of pesticides and the continuing objections to their use by environmentalists, more and more farmers are turning to what the experts call "ecologically based methods of pest management" — methods aided by computerized mathematical projections of what a particular insect population will do in a certain amount of time.

"Ecologically based pest management is based on the natural mortality of crop pests; we attempt to control them with minimum damage to the rest of the life in the fields," according to Dr.

Charles Summers, associated professor of entomology at the University of California at Berkeley (UCB). Summers is a research specialist working out of a university field station near Fresno.

Once an insect specialist has determined what insects are in a field after daily visits over a period of weeks, computers construct mathematical models that can predict how fast the pest population and the natural enemy population will grow, Summers explained. The projections are based on the numbers of insects present in the field and the conditions of the field.

In higher temperatures, insects develop more rapidly than in lower temperatures, Summers noted. After it is determined how rapidly a particular

type of insect grows, how long the insect will live, how often it will reproduce and how many offspring it will have, the computer provides a readout of the projected total number of insects per unit area at any given point in time.

Edge for Enemies

After Summers gathers data about a particular field, he sends the information to his colleague and the major developer of the program, Dr. Andrew Gutierrez, also a professor of entomology at UCB, 200 miles away.

Gutierrez processes the information on Lawrence Radiation Laboratories' Control Data Corp. 7600 mainframe or on the CDC 6400 in UCB's mathematics department. The specialist then

decides the best method of reducing the odds against the natural enemies of the pest.

"Generally what we try to do is make life on the farm more conducive to the natural enemy population and less conducive to the pest population," Summers said. "In alfalfa, for instance, if we cut down alternating rows, the pests will generally leave the area while the natural enemies will stay in the rows growing and multiply. By the time the pests return, the natural enemy has multiplied in sufficient numbers to control the pests." Summers said pesticides are used sparingly and only as a last resort if other methods don't work.

In order to get the service, California farmers buy pest management services from commercial firms. This computer service is furnished free because it is still in the developmental stages.

WHAT DOES AUERBACH THINK ABOUT INTERCOMM?

THE CLAIM: In a 360/370 OS or OS/VS environment with a dozen or even thousands of terminals, our INTERCOMM will run circles around CICS or any other teleprocessing monitor. It's the state of the art in large scale TP monitors.

THE EVIDENCE: The 1977 Auerbach report on INTERCOMM. Here's the bottom line:

"Why are we so high on INTERCOMM? Mainly because it has been in the forefront of technology for so long.

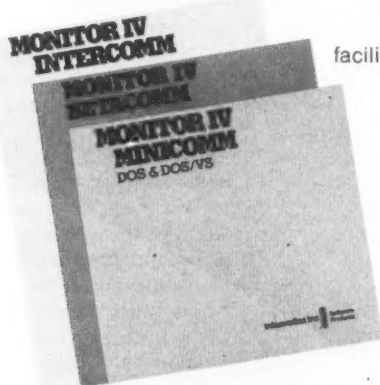
"Users also share our sentiments... all were quite satisfied with the system's performance... and the support has been outstanding.

"CICS is not all that bad. It is not, however, in INTERCOMM's class." (Emphasis added.)

We couldn't have said it better. Because INTERCOMM does more things and does them better than any other TP monitor.

Now take a second to find out why over 200 users have already opted for the world's most sophisticated teleprocessing software.

Call or write today... (calling is faster!) Brochures on products filling your precise requirements will be in the mail the same day.



BETACOMM: Designed for the medium to large size 360/370 DOS/VS user using on-line programming facilities. Increases programmer productivity 50 to 200%.

MINICOMM: For smaller DOS and DOS/VS users. Perfect 4.0 score in 1977 Datapro software survey for "overall" satisfaction."

informatics inc  **Software Products**

World's Leading Independent Supplier of Software Products



21050 Vanowen St., Canoga Park, Calif. 91304 (213) 887-9121
267 route de Meyrin, CH 1217 Meyrin 2, Geneva, Switzerland 41 022 82 51 51
Washington (703) 821-5900 Chicago (312) 298-9300

New York (212) 481-6800

Los Angeles (213) 822-3552

Exam for CDP Passed by 919

CHICAGO, Ill. — A total of 919 candidates out of 2,835 passed the qualifying examination for the Certificate in Data Processing (CDP) given last February, according to the Institute for Certification of Computer Professionals (ICCP).

The exam was offered at 136 sites compared with 124 sites last year. The largest number of candidates came from Illinois, California, New York and Texas, respectively, the ICCP said.

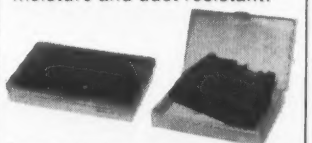
An analysis of the candidates prepared by The Psychological Corp. showed 35% were members of middle management and 49% held staff positions in education, government, financial institutions, insurance or consulting/service organizations.

Most candidates were between the ages of 26 and 35, but the number over 35 showed a "definite increase," the ICCP noted.

The next exam will be offered on May 5, 1979. Information on that exam is available from the ICCP at 304 E. 45th St., New York, N.Y. 10017.



UTILITIES & POWER COMPANIES
TAPE CASE for the cartridge used in magnetic tape translation systems. Clear, tough, moisture and dust resistant.



Sample mailed on request

BEEMAK PLASTICS

7424 Santa Monica Blvd.
Los Angeles, Cal. 90046, (213) 876-1770

For Users When Disaster Strikes DPS Planning Recovery Operations Centers

By a CW Staff Writer
HURST, Texas — Recovery Operations Centers (ROC) — preconstructed facilities standing ready to accommodate computer installations — are necessary if American businesses are to avoid the "potentially devastating effect" of losing DP facilities when natural disasters occur, according to Louis Scoma Jr., president of Data Processing Security (DPS) here.

DPS is planning to construct five ROCs, which will be supported by the sale of memberships in the centers.

Scoma estimated that 90% of American companies using computers would have to shut down for months if their computers were destroyed. A ROC would include appropriate power supplies, air conditioning and humidity systems and communications networks, allowing a CPU to be installed immediately on behalf of a member company whose computer facilities had been destroyed.

No Alternative

Scoma sees no alternative to the development of ROCs. In almost all cases, he said, firms would not be able to turn to other companies for DP support.

"Most companies lack the compatibility with another company's computer operations, both from a hardware and software standpoint — assuming they could find availability," he said. "Most companies are operating their computers at or near capacity and cannot afford to provide backup support for another company for any extended period of time without affecting their own operations."

Fraud Conference Set On Board Cruise Ship

SURREY, England — An international conference on computer fraud will be held Sept. 20-25 aboard the Queen Elizabeth II on her scheduled Atlantic crossing from Southampton to New York.

The price of the conference for U.S. attendees, is \$1,300 which includes a tourist class flight to Southampton and a "good" tourist berth to New York, according to the sponsor, 20th Century Security Education Ltd.

Come to Speak

Among the speakers at the conference will be Michael J. Comer, author of *Corporate Fraud*, and Peter Hamilton, computer and security expert and a member of the Chubb worldwide security team.

Additional information is available from Peter A. Heims, Cleeve Road, Leatherhead, Surrey, England.

DPS intends to get written commitments from suppliers regarding the availability of computer hardware and the time within which it could be delivered and made ready for processing.

"There will be some equipment which members of the ROC will want to preorder and install because of the unique characteristics or long lead time," he noted. Such equipment might include check sorters, scanners, computer output microfilm equipment and optical character readers, he said.

Membership in the first ROCs will be offered to selected companies at \$12,000 annually. A number of services will also be provided by DPS.

Members will be offered record stor-

age and magnetic tape and disk file verification services for files stored at the ROC. The ROC will be made available to members installing a new computer system and phasing out an existing system.

Members whose computer facilities have been destroyed may use the ROC to house their new computers while their facilities are being rebuilt.

Texas Site First

The first ROC will be completed in the Dallas-Fort Worth area this year, after the selection of the first members, initially limited to 35 companies, Scoma said. Other facilities will follow during the remainder of 1978 and in

1979 in Los Angeles, Chicago, New York and Atlanta.

"The ROC will be large enough to accommodate the essential computer processing for any three of its members in the event they simultaneously experience a major disaster," Scoma said. For this reason, no more than three member companies will be located within a one-half square mile radius of each other.

DPS will also be able to make available, for staff support, as many as 150 hotel rooms within a 24-hour period, he said.

The five ROCs will be connected through a communications network to provide backup capability.

**Introductory offer
to new members of the
COMPUTER PROFESSIONALS'
BOOK CLUB**

**any two
of these great
professional books
for only
\$2.95
values up
to \$68.50**

**Two special bonus books come to you
for \$2.95 with your first club selection**

Be sure to consider these books as well—

**768/641
MINICOMPUTER
SYSTEMS**
Organization
and
Programming
by R. H.
Eckhouse, Jr.
Pub. price, \$18.95
Club price, \$13.95

**772/118
ADVANCED ANS
COBOL WITH
STRUCTURED
PROGRAMMING**
by G. D. Brown
Pub. price, \$19.95
Club price, \$15.95

**168/075
AUTOMATIC
DATA
PROCESSING
HANDBOOK**
Edited by
The Diebold
Group, Inc.
Pub. price, \$33.50
Club price, \$23.75

**770/794
COMPUTER
ARCHITECTURE**
by C. C. Foster
Pub. price, \$17.95
Club price, \$13.95

**768/307
CONTENT
ADDRESSABLE
PARALLEL
PROCESSORS**
by C. Foster
Pub. price, \$12.95
Club price, \$10.75

**279/500
APL/360 PRO-
GRAMMING AND
APPLICATIONS**
by H. H.
Hellerman &
I. A. Smith
Pub. price, \$9.95
Club price, \$7.95

**783/802
SOFTWARE
METRICS**
by T. Gilb
Pub. price, \$16.95
Club price, \$13.50

**772/223
COMPUTER
STORAGE
SYSTEMS &
TECHNOLOGY**
by R. E. Matick
Pub. price, \$29.95
Club price, \$23.95

**769/29X
THE INFORMA-
TION SYSTEMS
HANDBOOK**
by F. W.
McFarlan &
R. L. Nolan
Pub. price, \$35.00
Club price, \$25.50

**769/77X
WRITTEN COM-
MUNICATION
FOR DATA
PROCESSING**
by R. S. Smith
Pub. price, \$12.95
Club price, \$ 9.75

**783/829
CURRENT
TRENDS IN
PROGRAMMING
METHODOLOGY**
by R. T. Yeh
Pub. price, \$19.95
Club price, \$15.50

**771/499
MICROCOM-
PUTERS/MICRO-
PROCESSORS:**
Hardware
Software and
Applications
by J. L.
Hilburn &
P. N. Julich
Pub. price, \$19.50
Club price, \$15.60

**773/009
MINICOMPUTERS:
Structures and
Programming**
by T. G. Lewis
and J. W. Doerr
Pub. price, \$13.95
Club price, \$11.75

**768/854
INFORMATION
& DATA IN
SYSTEMS**
by B. Langefors
& K. Samuelson
Pub. price, \$14.95
Club price, \$12.25

save time and money
by joining McGraw-Hill's new
**COMPUTER PROFESSIONALS'
BOOK CLUB**



THIS new professional club is designed to meet your day-to-day on-the-job needs by providing practical books in your field on a regular basis at below publisher prices. If you're missing out on important technical literature—if today's high cost of reading curbs the growth of your library—here's the solution to your problem.

The Computer Professionals' Book Club was organized for you, to provide an economical reading program that cannot fail to be of value. Administered by the McGraw-Hill Book Company, all books are chosen by qualified editors and consultants. Their understanding of the standards and values of the literature in your field guarantees the appropriateness of the selections.

How the Club operates: Every month you receive free of charge The Computer Professionals' Book Club Bulletin. This announces and describes the Club's featured book of the month as well as alternate selections available at special members' prices. If you want to examine the Club's feature of the month, you do nothing. If you prefer one of the alternate selections—or if you want no book at all—you notify the Club by returning the card enclosed with each Bulletin.

As a Club Member, you agree only to the purchase of four books (including your first selection) over a two-year period. Considering the many books published annually, there will surely be at least four you would want to own anyway. By joining the club, you save both money and the trouble of searching for the best books.

MAIL THIS COUPON TODAY

COMPUTER PROFESSIONALS' Book Club
P.O. Box 582 Princeton Road, Hightstown, New Jersey 08520

Please enroll me as a member and send me the three books indicated. I am to receive the two bonus books at the introductory price of \$2.95 plus my first selection, plus tax, postage, and handling. If not completely satisfied, I may return the books within 10 days and request that my membership be cancelled. If I keep the books, I agree to take a minimum of three additional books during the next two years at special Club prices (guaranteed 15% discount, often more). I will receive the Club Bulletin 13 times a year. If I want to examine the featured selection, I need take no action. It will be shipped automatically. If, however, I want an alternate selection—or no book at all—I simply notify the Club by returning the convenient card always enclosed. I will always have a minimum of 10 days in which to return the card and you will credit my account fully, including postage, if this is not the case. Membership in the club is continuous but cancellable by me at any time after the four-book purchase requirement has been filled. This order subject to acceptance by McGraw-Hill. Orders from outside the continental U.S. must be prepaid. Company, business, or institutional tax exemption status is not applicable to purchases made through individual Club memberships. All prices subject to change without notice. Offer good for new members only. A shipping and handling charge is added to all shipments. Members are billed when books arrive.

Write Code # of 1st bonus book selection here Write Code # of 2nd bonus book selection here Write Code # of 1st book selection here

Name _____

Address _____

City _____ State _____ Zip _____

EXTRA SAVINGS: Remit in full with your order, plus any local and state tax, and McGraw-Hill will pay all regular postage and handling charges. **P39295**

(402) 392-2606

**VOLUME DATA ENTRY
SERVICES ...
TAPE OR CARDS**

"QUALITY AT A LOWER COST"

**AMERICAN
KEYIDATA**

Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Federal Board Rules on S&L Teller Machines

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Home Loan Bank Board (FHLBB) has approved final regulations governing the use of remote electronic teller facilities by savings & loan (S&L) associations, including a number of consumer safeguards.

The action in late May preceded oral arguments scheduled for today, June 26, in a lawsuit filed by the Independent Bankers Association of America (IBAA) claiming the FHLBB has illegally entered the field of banking by giving S&Ls demand-deposit capability via electronic tellers.

The bank board has been authorizing remote teller facilities under temporary regulations on a case-by-case, "experi-

mental" basis since 1974. The last extension of the temporary regulations expires June 30.

Under the final regulations, remote service units (RSU) can be used for crediting and debiting savings accounts, making loan payments and for "other financial related services." The board defined an RSU as an information processing device, including a computer system, located off the premises of a federal association and requiring an activator for access.

The definition excluded telephone banking systems, according to bank board attorney Lois Jacobs.

The regulations, which will take effect July 1, call for the consumer to have a machine activator such as a card or, in the future, fingerprint or voice-

print and a personal security identifier (PSI), not necessarily a number, Jacobs said.

The regulations stipulate that an S&L must disclose to a prospective customer all the terms of the agreement, including what happens if the customer's activator is lost or stolen. The association must tell the customer that the PSI is a security measure and that it should not be given out, written on the card or kept with the card, Jacobs said.

Correcting Statement Errors

A holder of an active account must receive a statement every month; a holder of an inactive account must receive a statement quarterly.

In the area of error resolution, a con-

sumer must notify the S&L within 60 days in writing of any error on a statement. The S&L then has 10 business days after receiving the error notice to resolve the matter by either correcting the error or by furnishing written proof of the transaction as it appeared on the statement, Jacobs explained.

The regulations hold the financial institutions liable for RSU losses in most cases — if a transaction is not carried out correctly, if an error is not corrected within 10 business days of notification or if the bank processes a transaction from an unauthorized person — unless it can show the consumer was negligent.

The regulations provide that the customer must receive a receipt of each transaction printed by the machine; if the transaction is written, both the customer and RSU operator must sign the document, Jacobs said.

Privacy Provisions

Concerning the privacy of account information, the regulation allows an account holder to access any information about his own account. However, except for generic data, no information can be disclosed to a third party except the bank board.

The FHLBB examiners need general information in their annual examinations of S&Ls' financial conditions, Jacobs explained.

The bank board, once it gets the information, is subject to the Privacy Act of 1974, she noted. "I think we've made excellent and specific attempts to keep account information private," she said.

When a federal association shares a system or has a contract with a third party, such as a merchant, the third party must treat account data as the association treats it, according to the regulations.

Security Clearance

The regulations state that an association needs a security clearance before filling out an application for establishing an electronic teller system.

If a system has anticompetitive implications, the board may ask the Justice Department to comment on it, Jacobs said.

Many of the recommendations made by the National Commission on Electronic Fund Transfers were implemented in the regulations, Jacobs said. "All this time we've approved RSU systems in federal associations, so we know when they've worked and when they haven't. Hopefully these current regulations reflect the best thinking of these years of practical and philosophical experience," she added.

Lawsuit Issue

According to FHLBB counsel Harvey Simon, the issue in the lawsuit concerns a section of the Homeowners Loan Act stating that savings accounts are not subject to negotiable or transferable order or authorization, but may be subject to nonnegotiable order or authorization.

"The question is whether the machine-readable card used to access the savings accounts through an RSU is the same as a negotiable instrument. We think it pretty clearly is not," Simon said, adding that the bank board is optimistic about the outcome of the case.

It was just a matter of time...

One year ago, when we introduced the original mini 370 emulator — the DUO 70 minicomputer system — we knew it was just a matter of time before someone tried to emulate us.

WE'RE STILL WAITING!

Announcements come and go but there is still only one mini 370 emulator available to you now! And that's the DUO 70.

RIGHT NOW... there's no need to wait until next Fall or next year to have a 370 compatible mini running in your shop. You can order a DUO 70 today, and have it delivered, installed and running your IBM applications programs a couple of weeks from now (unless you're standing way back in line).

RIGHT NOW... the DUO 70 can give you performance in the 370-145 range, can stand alone or be channel or bisync linked to a 360/370 for offloading and program development, and can support more mini or IBM peripherals than you can probably use.

RIGHT NOW... your DUO 70 can be ordered with any of IBM's compilers and comes with so many

support features that your IBM-trained staff won't even know they're not on "the big blue box." And as for maintenance, you have more than 100 support and maintenance facilities worldwide, waiting to serve you. AND NOW THE BOTTOM LINE... today your DUO 70 can be bought or leased for 1/10th the price of a comparable 370... for 1/5th the price of any plug-compatible... and 1/3rd cheaper than anything maybe available next year.

We're still waiting. Should you?

KARDIOS

THE KARDIOS SYSTEMS CORPORATION

26 North Summit Street

Gaithersburg, Md. 20760

301 840-9225 TWX 710 234-1078

Europe: Intersystems AG, Basel, Switzerland (061) 35 09 25

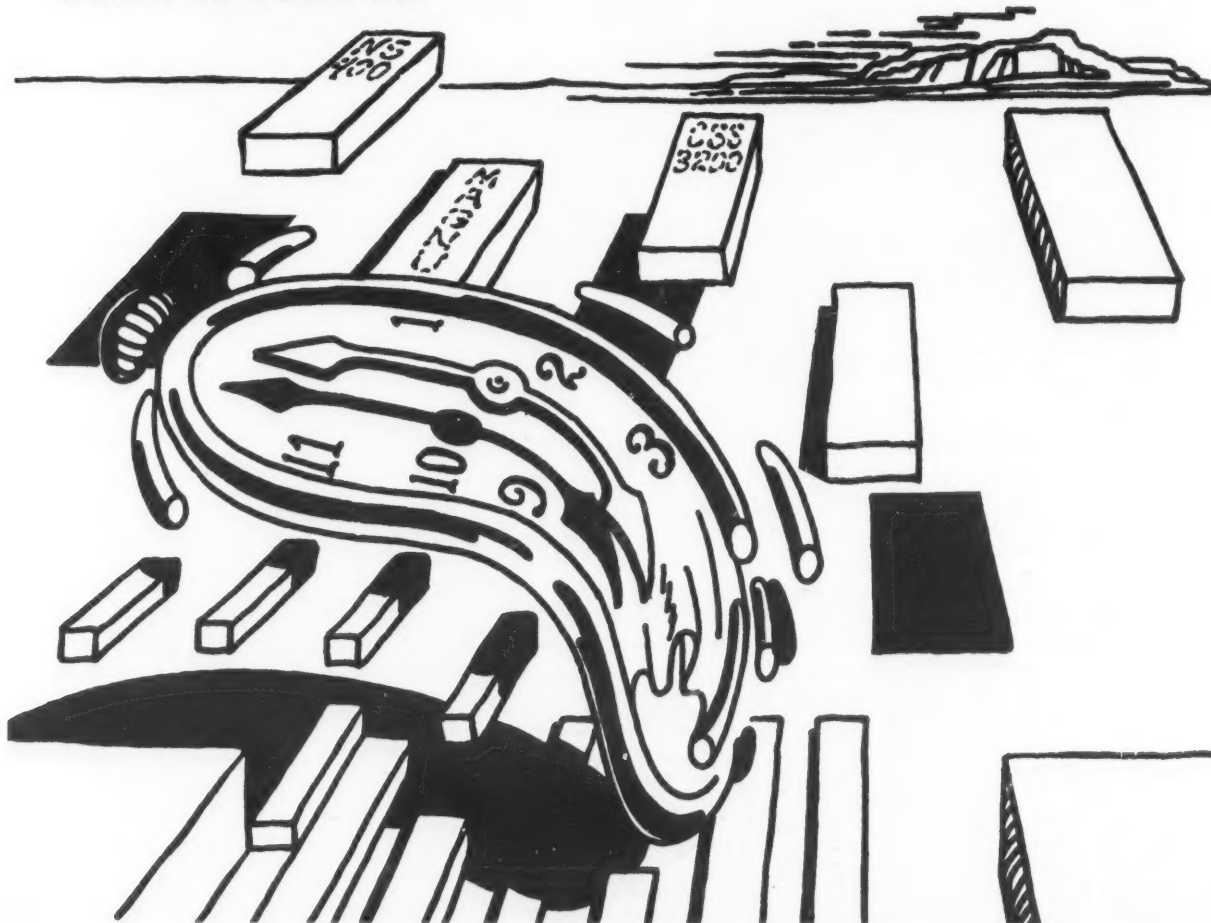
Africa: Protea Computers, Johannesburg, S.A. 786-3647

West Coast: Codemation Industries, Inc.

Canoga Park, Ca. 91307 (213) 346-9687

Even promised emulation is some form of flattery.

and it still is.



COMPUTERWORLD



... the one
weekly newspaper
that's designed to fulfill your
unique "need to know" ...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress ...
52 weeks of incisive news,
commentary and special
reports ... subscribe today,
use the attached postage paid
order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:
☐ address
☐ title
☐ industry
☐ other

My current mailing label is attached
and I've filled in new information
on the other side

Put old label or label information here

☐ Check Enclosed
 ☐ Am Ex
 ☐ BA/Visa
 ☐ MC
 (MC Only - List four digits above your name)

If charge we must have
cardholder's signature: _____
Expiration Date: _____

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Mail To:												
City					State			Zip Code				

Address shown is:

☐ Business

☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

- 10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other.

TITLE/OCCUPATION/FUNCTION

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Finance Officer
- 21 Director/Manager of Operation/Planning/
Administrative Service
- 22 Director/Manager/Supervisor DP
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 41 Application Engineer
- 42 Other Engineering
- 51 Mfg. Sales Representative
- 52 Other Sales/Marketing
- 60 Consultant
- 70 Lawyer/Accountant
- 80 Librarian/Educator/Student
- 90 Other



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT., 797 Washington Street, Newton, Mass. 02160

Detach here, fold, and place in post-paid envelope attached through binding.

Panel on Document Dispersal: End-User Role Vital in Office System Plans

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — The solution to inefficiency in office automation lies in integrating word processing and message switching systems, and successful implementation depends on end-user involvement at the planning stages.

These were conclusions reached by a panel of experts at a National Computer Conference session here recently on computer-based document distribution.

Document distribution, defined as a subset of electronic mail, can include voice, facsimile or computer-based systems, according to session chairman Gwen C. Edwards, assistant director for policy development at Bell Canada.

According to a Bell Canada survey of 200 institutions — 40% of which were government agencies, 30% industry and 30% research organizations — personnel resented computer-based document distribution systems if they were not involved with them from the beginning, Edwards said.

People with positive perceptions of such systems used them more, and the more they used them, the more positive their perceptions became, she said.

Twenty-two percent of users surveyed developed more negative attitudes over a period of one year, and the reason was overwhelmingly access problems, the survey showed. Most users however, experienced positive changes in their perceptions, Edwards said.

According to the survey, people will not tolerate problems associated with access and response time, Edwards said. In addition, it is essential to them to be able to retrieve messages sent, which the survey indicated they did an average of 15 times per week. In this area, electronic message systems are superior to the traditional TWX and Telex systems, which generate "cumbersome" hard copy, Edwards said.

Army Case Study

A case study of one organization's electronic mail system revealed both positive and negative effects on personnel. The U.S. Army's Development and Readiness Command (Darcom) in Alexandria, Va., uses a Texas Instruments, Inc. Silent 745 portable terminal to hook up with the Arpanet network for frequent transmission of "very complex documents," according to John Gilbert, Darcom's director of management information systems (MIS).

He was enthusiastic about the system, noting it has text-editing, filing, searching and spelling-correction capabilities.

Gilbert said Darcom began using the system in November 1974 as an experiment with no particular objective, "just to see if our business operations changed in any way in the course of a year." By December of the same year, Gilbert said, "I was hooked." Within six months, substantial effects were being felt.

First of all, the system became a substitute for phone calls, Gilbert said, noting that it eliminated interrupting other people and also eliminated the "missed phone call" syndrome.

In addition, his travel patterns

changed. He used to visit associated offices about once a month, but with the electronic mail system he now goes six months at a time without visiting, he said.

Gilbert also mentioned that he can now communicate with large numbers of people on the same matter simultaneously by entering an address list into the system for forwarding the message to the desired people. "This results in a broader base of information for everyone involved," he said.

He pointed out that when he logs into the terminal for receiving his mail, he is psychologically in a more receptive frame of mind and is ready to get the most information input.

By the summer of 1975, nine months after its installation, the system's use began to spread, Gilbert said, as others became aware of it. It is now being used by a number of other Army communities, such as the International Logistics Committee, Test and Evaluation Command, the Arctic Test Center and the Tropic Test Center, Gilbert said. The system has overcome time zone lags and speeds up communications "tremendously," he said.

Some Problems

The system has presented a few problems, according to Gilbert. First, message-switching and text-editing functions are not well integrated, resulting in "irritating confusion" for the user of the terminal, he said. In addition, access problems, or "busy signals," also annoy users.

Further, managers are reluctant to touch terminals because they view them as "demeaning." Gilbert suggested this problem could only be solved by "dying off this generation of managers."

A way of monitoring the quality of service should be developed, he added. Gilbert also advised MIS managers to "learn to type."

Another case study of the use of electronic message switching — this time by Hotline International (HI), a non-profit service organization based in New York — illustrated document distribution worldwide.

For the past four years, HI has worked with United Nations consultants around the world using document-distribution and message-switching technology to extend participation in pertinent conferences and to help political figures make informed, intelligent decisions on timely issues, such as the environment, according to Glen Leet, director, and Mildred Robbins Leet, codirector of the firm.

Thirteen colleges and universities and 100 national and international nongovernmental organizations are involved in HI. The service organization's activities are focused in 10 U.S. cities and in London, Paris, Montreal, Toronto and Vancouver.

The first conference hookup was between Nairobi, Kenya, and the U.S. in 1974. The Leetses used a TI Silent 700 terminal transmitting over telephone lines to an IBM 370/168 in the U.S. Once they got the Nairobi telephone operators to understand that a tone, not a voice, would be transmitted over the wires, they had no problems, they

said. Government cooperation was no problem either, they said, because "Kenya was extremely proud to have direct communications with the U.S."

They noted that with electronic com-

munication, the input is often "less emotional, more precise and more concise." Concerning the U.N., the Leetses said the system reduces costs and improves the quality of decisions made.



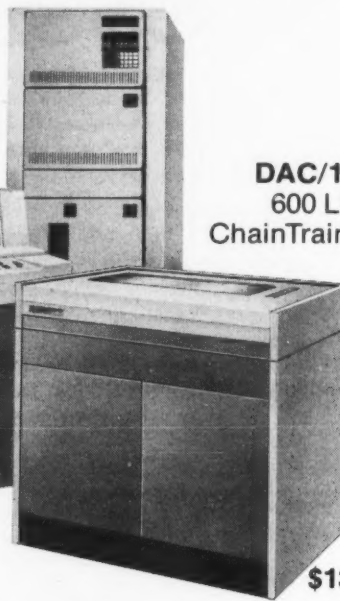
IBM Series/1 Users: Look how much more printer you get for \$1 ...

IBM 4973-2
300 LPM
Band Printer



\$13,365

DAC/1-600
600 LPM
ChainTrain Printer



\$13,366

For just **ONE DOLLAR** more, you can get a 600 LPM heavy duty ChainTrain printer for your Series/1 from The Printer Store instead of an IBM 300 LPM 4973-2 band printer. Our DAC/1-600 offers superior letter quality printing. It comes complete with a DAC S/1 printer controller attachment, a single printed circuit board that plugs directly into an I/O slot of the IBM processor or the IBM input/output expansion unit, and does not require modifications to IBM Operating Systems. And if you choose the higher speed

DAC/1-1000 LPM printer, you improve upon price/performance even more.

The Printer Store is **THE** alternative source for Series/1 line printers with installation and maintenance service available on a nationwide basis. We also offer line printers that are compatible with DEC, Data General, Hewlett-Packard, Interdata, G. A. and most other minicomputer systems. Contact The Printer Store for specific price information on the printer of your choice and get your **DOLLAR'S** worth.

IBM SERIES/1 USERS SAVINGS COUPON

☐ Show me how much more I can save on printer systems from The Printer Store.

Name

Company

Street

City State Zip

Phone

Digital Associates Corporation, 1039 E. Main St., Stamford, CT 06902
Call Toll Free 800-243-9054

Whitman College Sharing Admissions Software

By Ann Dooley

CW Staff

WALLA WALLA, Wash. — Whitman College here is sharing its admissions software with Seattle University's admissions office so both schools will have a more efficient student tracking program.

The software system, developed by Whitman College last fall, tracks a prospective student from his first contact with the school through the entire admissions process, according to R.R. Thomassen, director of the school's computer center.

Each of the schools use a Hewlett-Packard Co. 3000 Series II Model 8 system. When Seattle University administrators heard about Whitman's admissions package, they approached

Whitman officials for help.

"We were pleased Seattle University felt free to ask for help. Such cooperation is all too rare among schools in higher education," Whitman President Robert Skotheim said.

Whitman decided to give the admissions program package to Seattle University as a gift because both colleges' requirements are very similar. "Seattle University needed a program such as this, but was not really equipped to develop one for itself. Our program was readily adaptable to its needs and we decided to share our system," systems analyst Wayne Holt said.

Holt worked with Seattle University admissions personnel in installing the software. The system consists of 50 files and 32 programs; all of them were

used, since Seattle's admissions program is very similar to Whitman's.

The program was modified only slightly by Seattle University. The changes were few and amounted mainly to changes in wording, Holt said.

"Essentially, Holt brought a tape over and loaded it up in two days," Mike Fox, Seattle University's program director, recalled. The initial phase went very smoothly and there have been only about 20 hours of revisions spread out over the six weeks since the program began operating, he said.

If there are any problems, Holt "comes over and irons them out," Fox said.

Seattle University still hasn't received the documentation, which is being

done more slowly than the installation phase, Fox said. But since there haven't been any bugs, it's been no problem, he added.

When the system was installed, Holt and the Seattle University admissions staff ran all the programs to make sure they were operating properly and then printed them up as a final check. The process required a lot of cooperation between the user and the computer center, Fox noted.

"We're very pleased with the program and Whitman's cooperation in working with us," according to Mike Lyons, director of Seattle University's high school/college relations. Seattle University's old method of key-punching the information took much longer and was not as easily accessible, he said.

Join the procession.

Get in on the conference and exposition designed especially for information processing professionals. Join the procession to DPMA New Orleans '78, the international conference and business exposition of Data Processing Management Association.

On October 29 through November 1, 1978, men and women from throughout North America, Japan, Europe and South America will meet at the New Orleans Hilton to participate in educational seminars, panel discussions and symposiums—all designed for the specific needs of the DP management professional. A special highlight will be a general session of top corporate executives participating in a discussion of how DP management experience can lead to top-level corporate positions. This year's conference will also include such relevant topics as:

Human Resource Development	EFTS
Audit Performance Management	Minis v. Maxis
Disaster Planning and Recovery	Distributed Processing
Network Management	The Electronic Office

The business exposition held in tandem with the conference offers participants the chance to get first-hand information on the latest in EDP equipment and computer-related supplies and services.

Companies like Boeing Computer, Computer Associates, Datagraphix, IBM, Quantor, Sycor and Texas Instruments, plus many, many others, will be exhibiting at DPMA New Orleans '78.

The conference also includes a special session for student participants and an excellent program for guests who wish to enjoy the southern hospitality of New Orleans. The guest program features city tours of such highlights as the French Quarter and the Garden District, plus an afternoon steamboat cruise and an

"Ante-Bellum Days" visit to several historic plantations. And, of course, the special lure of New Orleans nightlife will embrace all who attend.

Just fill out and mail the coupon below to receive complete registration materials and additional information on DPMA New Orleans '78. Plan now to attend . . . for the best in EDP technical and management seminars . . . plus the French Quarter, Bourbon Street and all that jazz!



DPMA
**New
Orleans
'78**

CW

Send to:

New Orleans '78
c/o Data Processing Management Association
505 Busse Highway
Park Ridge, IL 60068

- ☐ Please send me Conference registration materials
☐ My company's interested in exhibiting—send exhibit info
☐ I'd like free exhibit-viewing tickets

Name/Title

Company

Address

City/State-Prov./Zip-Postal Code

Student Tracking

In developing the initial system, admissions officials at Whitman knew what they wanted and worked closely with the computer center to get it, Thomassen said. The system was designed so that when the admissions office gets an inquiry from a prospective student, the student is assigned an identification number.

The student's name and address as well as details about his interests are entered into the system's data base via CRTs. Additional information is entered as the student makes further inquiries or applies for admission.

The system prints a mailing label for all correspondence with the student, Thomassen said.

Information such as high school grades, entrance test scores, ethnic background, how the student found out about the school and outside interests is entered into the system.

In addition to its use in tracking prospective students through the admissions process, the data base is accessed for statistical analysis reports, according to Thomassen. Any common group of students can be extracted from the data base for special purposes, such as when the football coach wants to know which entering students had experience in the game.

A student's privacy is protected because users must know the right password before getting into the system, Thomassen said. A daily audit trail is run to determine who used which files and for what purposes.

Other schools have expressed interest in Whitman College's admissions program package, but difficulties arise when working with non-HP equipment, Thomassen said.

Conference to Focus On DP Productivity

WASHINGTON, D.C. — The Second National Conference on Computer Systems Productivity will be held here June 28-30.

Featured topics include an update on the latest enhancements to data base management systems, a review of the most recent security and privacy issues relating to computer systems, a special intensive general session on structured analysis methodology and a review of the microcomputing revolution.

The fee is \$325. For additional information, contact the Institute for Professional Education, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

IBM Leasing: How to Optimize Your Cash Flow

By Marcia L. Geyer

Financial advantages are buried in the text of IBM's new Lease Rental Agreement (LRA), compared with earlier IBM leases, that data processing managers can use to their companies' benefit.

The most notable improvements are:

- Lower termination charges, especially in the last six months of the lease.

- Some no-charge conditions for early termination of features and, in some customers' LRA Supplements, a documentation deficiency that lists features as not subject to termination charges at all.

- Purchase price protection and documentation of purchase credit accruals during the life of the lease.

But there are a couple of points of which users should be aware. One is the need to give 30 days' written notice when discontinuing or downgrading a machine at the end of a lease term. The other is the "Upper Limit Percent" box, which some day will mark the end of price protection for the monthly lease charge during the term of the lease.

Differences in Plans

The differences between the older types of IBM leasing plans and the LRA are not in monthly lease payments. Monthly payments for, say, a two-year lease of a Model 3350 disk unit will be the same under the LRA, Fixed Term Plan (FTP) and Extended Term Plan (ETP) agreements. The monthly lease payment comes from the IBM sales manual.

But the default billing action (if you neglect to cancel or renew the lease for a piece of equipment at its expiration); the early termination charge if you cancel early or require a factory modification of the machine; the price protection of the monthly lease payment and of the purchase price; and the applicability of termination charges to optional features — all of these are handled differently in the LRA than in the previous leases.

A DP user's changes of plans that cause early termination are given better treatment under the LRA than un-

der the earlier lease plans in almost all cases. The few exceptions will be noted later, and we will examine the impact of termination schedules in depth.

Customer Financial Management

The LRA lease may have been written by IBM with the intention of fostering better customer financial plan-

well in advance.

There is a fascinating little box on the LRA Supplement marked "Upper Limit Percent." It stipulates the amount that lease payments may be annually increased during a lease.

The practical significance of this new IBM option was not evident in my research of pricing for a number of ma-

the LRA does not subject the customer to any early termination charge at all.

Unfortunately, policy in this area is not as clearly documented as the other LRA financial variables. One installation's LRA Supplements list the early termination charge for each of its features as "N/A," or no applicable charge. Its IBM support staff, however, informed it of a list of conditions under which termination charges would not apply, implying that in other cases there would be termination charges.

Since the no-charge categories for features are not listed anywhere in the LRA or its Supplements, and this installation's contracts say "N/A" for each feature's termination charges, the site will have excellent grounds for a billing argument later on if it discontinues a feature in a manner that does not happen to fall under the "no-charge" categories quoted to it and if IBM attempts to bill it for early termination of a feature. Perhaps you, too, will be equally fortunate until such time as IBM documents its policy within the contract itself in a clear and unambiguous manner.

Early Terminations

After establishing the suitability of a new type of equipment within one's hardware/software configuration, the best reason for not signing a two-year lease is the expense of changing plans if new gear with an improved price/performance ratio becomes available or if any number of conditions change within the organization, leading to a change of configuration.

In the real world of DP management, a clear vision of the next 24 months' equipment needs, as perceived by one's senior management and users, may indicate miraculous powers of clairvoyance in addition to normal business acumen.

However, there is good news: the LRA treats customer changes of plans in the later months of the lease considerably less harshly than previous IBM leases. The incentives for leasing have been increased because the difference

(Continued on Page 20)

IN DEPTH IN DEPTH IN DEPTH

ning and lease management. Certainly that effect is promoted in a conversion to the LRA lease because all the leases which have been executed over the past years are gathered into one bundle of LRA Supplements (the individual pages executed for each equipment type).

The purchase-price ceiling during the term of a lease under the LRA may only reflect the current reality that IBM purchase prices will, if changed, go down rather than up. Or the ceiling may be a swap for the new IBM option to increase monthly lease charges during the term of the lease, subject to a maximum percent increase per year.

In any case, because the maximum purchase price — the current purchase price at the time the Supplement is executed — and the rate of accrual of purchase-option credits are documented in the LRA Supplement, the alert DP manager can, for the first time, calculate exactly when exercising the purchase option will be most advantageous and can budget this move

chines because in each case the Upper Limit Percent was zero, indicating no increase.

My best guess is that the option will be applied after previous forms of leases have been totally withdrawn from use, perhaps when a future generation of equipment is introduced.

Discontinuing Features

The terms for discontinuing features attached to leased machines are clearly better under the LRA than under previous leases. Under the FTP and ETP agreements, the monthly lease charge for a machine and the features installed with it are listed as a single amount on one line. The termination charge is a certain number of months multiplied by this amount.

On the LRA Supplement, however, there is a separate line for each model or feature number that lists, among other things, the monthly lease charge and the termination values. There are several conditions under which early termination of a feature leased under

IN DEPTH

EARLY TERMINATION CHARGES
AS NUMBER OF MONTHS' LEASE PAYMENTS
FOR TWO-YEAR IBM LEASES

Month of Lease	Type of Lease		
	LRA	FTP	ETP
1	5.00	5.00	5.00
2	5.00	5.00	5.00
3	5.00	5.00	5.00
4	5.00	5.00	5.00
5	5.00	5.00	5.00
6	4.75	5.00	5.00
7	4.50	5.00	4.00
8	4.25	5.00	4.00
9	4.00	5.00	4.00
10	3.75	5.00	4.00
11	3.50	5.00	4.00
12	3.25	5.00	4.00
13	3.00	2.50	3.00
14	2.75	2.50	3.00
15	2.50	2.50	3.00
16	2.25	2.50	3.00
17	2.00	2.50	3.00
18	1.75	2.50	3.00
19	1.50	2.50	2.00
20	1.25	2.50	2.00
21	1.00	2.50	2.00
22	.75	2.50	2.00
23	.50	2.00	2.00
24	.25	1.00	1.00

Figure 1

(Continued from Page 19)

between the lower lease rate and the early termination payment is likely, under the LRA, to be in the customer's favor.

Basis of Comparison

It took considerable digging to discover the superiority of the LRA early termination charges. The problem was translating early termination charges into commensurate terms among the leases by using a unit of measure that can be compared at each month in the life of the lease.

The FTP and ETP formulas for early termination charges are quite straightforward. For example, early discontinuance during the second six-month period of a two-year ETP lease entails four months' lease payments.

Like the other financial terms, the early termination charge of the LRA is a variable filled in on the individual Supplement. To further complicate matters, the charge is the lesser of two amounts, either "x" percent of the total remaining contract value or "y" months' payments.

In all the cases I have examined, the value of "x" is 25% of remaining contract value, and the value of "y" is five months' lease payments. So I didn't need a computer to translate the re-

maining value of the contract into a specific number of monthly lease payments at each month of the lease.

Figure 1 shows the termination values for each of the three leases, expressed as number of monthly lease payments. I would caution contract administrators to check the column on the far right of the LRA Supplement for the numbers "25/5."

If the first number is not 25, the remaining contract value for that machine must be recalculated, working back in time from the last month to the month when the percent of remaining contract value is greater than or equal to the number of monthly payments listed as the second termination value on the Supplement.

As Figure 1 shows, early termination charges under all three lease plans are five months' lease payments if termination occurs during the first five months of the lease. Thereafter, LRA early termination charges are lower than those of FTP except in months 13 and 14 and lower than those of ETP except in months 7, 8 and 9.

Usually, then, early termination costs less under the LRA than under previous forms of leasing. This is always the case after the 14th month of a 24-month lease.

It should be noted that the values lis-

ted under months 13 through 24 of the LRA are the termination values, i.e. 25% of remaining contract value, in months 1 through 12 of an LRA one-year extension. But the amount of the monthly lease payment by which these values are multiplied is higher for a one-year term than for a two-year term.

Conversion Loophole

The pattern of early termination charges revealed above is of practical significance if your installation is currently leasing gear under the FTP or ETP that you would like to discontinue. You may profit by converting the gear to LRA before giving notice of early termination, even if the LRA conversion delays your notice by one additional billing cycle.

Particularly in the final two months of a lease, the LRA assessment of 25% of the remaining value of the contract stands out in favorable contrast to the ETP and FTP assessments of the whole remaining contract value as the early termination charge.

If there are any optional features attached to a leased machine, there may be further improvement through the omission of their lease payments from the amount of the monthly payment which is multiplied by remaining contract value to obtain the early termination charge.

If the features are listed on the Supplement as having a termination value, you can still check with IBM for a list of no-charge conditions that apply to them. You will probably find a condition which you can use in your particular sequence of removing or reconfiguring machines.

Expiration Options, Defaults

At the expiration of any of the leases, your choices are as follows: execution of an LRA Supplement for the full term; a one-year LRA extension if the machine has previously been converted to LRA; a one-time less than one-year LRA Extension; monthly rental; discontinuance; or downgrading of the machine.

If the customer does not notify IBM that he wishes to take any of these actions, the default action at termination of an FTP or ETP lease is transfer to monthly rental at the premium Monthly Availability Charge (MAC) rate. Failure to convert from earlier forms of leasing to the LRA as leases expire and are withdrawn also results in reversion to MAC.

If the customer fails to take any action at the expiration of an LRA, the LRA default action is an automatic one-time, one-year extension, followed by transfer to monthly rental under the LRA if there is still no notice from the customer.

In the absence of any information, the LRA default to a one-year extension may well be the most economical way IBM can take care of the customer's interests. But as with any automatic renewal, you don't really want to be taken by surprise.

Execution of a new Supplement for a full term (presumably two years, although this, too, is a variable filled in on the Supplement), extension for a year or less than a year and conversion to rental can all be done as late as the day the LRA expires.

But beware: if you wish to discontinue or downgrade a machine at the expiration of its LRA lease term, you must give 30 days' prior notice. And although IBM is obligated by the terms of the LRA to inform you in advance of the new lease prices, it is not required to bring the expiration to your attention 30 days or more in advance.

To be safe, you may wish to establish a contract administration "tickler" file, alerting you at least 60 days in advance that it is time to obtain prices and to make a decision about the disposition of the leased gear.

Choosing a Renewal Term

If you know of a planned replacement or reconfiguration of your leased machine, it is not too difficult to select the term of renewal. The first likely month of replacement or downgrade or upgrade which is not field-installable should be the last month of your LRA extension, since you can always retain the machine on monthly rental if schedules slip a bit.

But if the future is less certain — if a contemplated replacement may or may not occur in about 18 months, for example — the economics of a one-year extension vs. a two-year new Supplement should be examined as to the total cash outflow for the cases you can foresee. The case study which follows demonstrates a simple method for finding the least costly LRA lease renewal option.

Printer Case Study

Suppose you are considering upgrading from a Model 3211 printer to a 3800 printer subsystem, on order, in December of 1980. But you don't yet know whether you will obtain approval for the additional expense in your annual budget.

If you can't upgrade, you would like to continue to accrue purchase option credits as quickly as possible and will probably convert the 3211 to installment purchase when it is fully accrued.

Furthermore, let us suppose that you have already converted your leased gear to the LRA and that the converted Supplement for the 3211 expires on May 1, 1979. Now you have to decide whether to execute a new two-year Supplement or a one-year extension.

The current monthly lease price quoted you for a 3211/001 is \$1,680 on a two-year lease and \$1,840 on a one-year lease or less than one-year extension.

Figure 2 shows the accumulated monthly lease payments for a two-year term in Column 1 and the accumulated monthly payments for two one-year extensions in Column 5. For the purposes of this exercise, the dubious assumption is made that there will be no

IN DEPTH

increase in lease price at the beginning of the second one-year term, since we cannot know in advance how much it will be.

Early termination charges are shown in columns 2 and 6. The numbers in Column 2 are the product of \$1,680 times the LRA values in Figure 1. The numbers in Column 6 are the product of \$1,840 times the values in the LRA column of Figure 1 in months 13 through 24 (as explained previously) and are repeated for each year of the lease period under consideration.

Finally, the numbers in columns 3 and 4 are the total cash outflow if the lease is terminated early at the month shown (not including sales tax). The numbers in Column 3 are the sum of the prior month amount from Column 1 — that is, the monthly lease payments to date — and the current month termination payment from Column 2.

The numbers in Column 4 are the sum of the prior month lease payments from Column 5 and the current month termination charge from Column 6.

Comparing columns 3 and 4 in Figure 2, we see the two-year term is less costly if the 3211 is kept for more than 12 months.

Let us assume, however, that you would know at the expiration of the one-year extension what the correct number of months for a less than one-year second extension would be and that you would thereby be able to avoid early termination charges. Comparing columns 3 and 5, we see that the least costly method of leasing for a period of 13 to 15 months is a one-year extension followed by an extension of one, two or three months.

But for a period of 16 to 24 months, the total of monthly lease payments and early termination charges under the new two-year Supplement is less than monthly lease payments alone under two extensions. This is a finding worth considering seriously.

To repeat, for it is surprising, the current discount structure of the 3211, to which we have just applied a cost accumulation procedure, is such that, when combined with the LRA termination charge formula, it costs less to sign for two years and cancel during the final nine months than to lease for a precise 16- to 23-month period.

Further, we have obtained this result without considering the present value of money or factoring in a probable increase in the monthly lease payment at the beginning of the second term.

For the circumstances of this case, therefore, you would choose a two-year LRA term as the option which will certainly be least costly, whether you trade in the 3211 for a 3800 after 18 months or keep it for the full term.

The Context of Incentives

Placing the increased financial incentives of the two-year LRA lease in proper context is both a speculative endeavor and an evaluation which each installation's management must make by taking into account the shop's growth pattern, its tendency to stay at

CASH FLOWS FOR 3211/001 LRA LEASES						
TWO-YEAR SUPPLEMENT				TWO ONE-YEAR EXTENSIONS		
Month of Lease	Aggregated Monthly Lease Payments	Early Termination Charge	Total Cash Outflow at Termination	Aggregated Monthly Lease Payments	Early Termination Charge	
Column	(1)	(2)	(3)	(4)	(5)	(6)
1	\$1,680	\$8,400	\$8,400	\$5,520	\$1,840	\$5,520
2	3,360	8,400	10,080	6,900	3,680	5,060
3	5,040	8,400	11,760	8,280	5,520	4,600
4	6,720	8,400	13,440	9,660	7,360	4,140
5	8,400	8,400	15,120	11,040	9,200	3,680
6	10,080	7,980	16,380	12,420	11,040	3,220
7	11,760	7,560	17,640	13,800	12,880	2,760
8	13,440	7,140	18,900	15,180	14,720	2,300
9	15,120	6,720	20,160	16,560	16,560	1,840
10	16,800	6,300	21,420	17,940	18,400	1,380
11	18,480	5,880	22,680	19,320	20,240	920
12	20,160	5,460	23,940	20,700	22,080	460
13	21,840	5,040	25,200	27,600	23,920	5,520
14	23,520	4,620	26,460	28,980	25,760	5,060
15	25,200	4,200	27,720	30,360	27,600	4,600
16	26,880	3,780	28,980	31,740	29,440	4,140
17	28,560	3,360	30,240	33,120	31,280	3,680
18	30,240	2,940	31,500	34,500	33,120	3,220
19	31,920	2,520	32,760	35,880	34,960	2,760
20	33,600	2,100	34,020	37,260	36,800	2,300
21	35,280	1,680	35,280	38,640	38,640	1,840
22	36,960	1,260	36,540	40,020	40,480	1,380
23	38,640	840	37,800	41,400	42,320	920
24	40,320	420	39,060	42,780	44,160	460

Figure 2

the leasing edge of hardware and software technology and the direction of its major application development efforts.

Certainly there is a correlation between the highly visible reductions of purchase price we have witnessed during the past year and the several relatively obscure financial incentives of the LRA, which have been analyzed here.

Many knowledgeable users await the announcement of the next real generation of IBM hardware, viewing recently announced systems like the 370/155 as transitional models. At the same time, acute shortages and horrendous lead times are the rule for many lines of IBM equipment.

A long-term commitment to a tape drive is not equivalent to a long-term commitment to a terminal or teleprocessing controller. The tape drive is not likely to stand in the way of user progress, but a teleprocessing device unsupported by the interactive financial program product desired by a

powerful user could become useless in some environments.

Recent price/performance trends might give pause to the larger shop's DP executive when it comes time to renew a lease for a group of 3330 Model 1 disk drives. But in a stable DOS/VS shop which carefully limits its disk requirements, another two-year lease of

these disks might be a very sound, economical management decision.

So the advisability of leasing depends upon the particular equipment, both in the context of a particular installation's DP objectives, scale and state-of-the-art inclinations and relative to the particular machine's progress toward obsolescence.



Marcia L. Geyer is president of Geyer Human Information Services, Inc. in New York City. Her firm, which offers DP management consulting services to users and vendors, specializes in the writing, negotiation and administration of contracts, in management planning assistance and in analyses of technical and financial problems and goals.

Geyer began her career in DP at IBM's Systems Development Division in Poughkeepsie, N.Y. She spent several years with American Airlines as a systems programmer and DP training coordinator and with Inco Ltd. in several DP management positions.

Editorial

Communications Bill of '78

No one likes to have his security blanket wrenched away from him with unexpected vigor. But that is what the Communications Act of 1978 would do to many sectors of the common carrier area if it is enacted into law in its present form.

Already there are rumblings that the long, drawn-out rule-making proceedings before the Federal Communications Commission actually have a "stabilizing effect." Others claim that the so-called Section 214 authorizations which explore a carrier's ability to provide service are provisions which must be tolerated.

These statements are motivated by the uncertainty of what a deregulated industry would spawn. Those previously favoring an AT&T with freedom to compete now ask for guarantees against unfair competition. And the prospect of an independent Western Electric Co. is tempered by the thought that such a vendor, if it chose, would have quite a clout in the medium-scale mainframe area.

In the shorter term, it is puzzling to consider the role of a competitive AT&T affiliate without in-house Western Electric equipment to offer. Even the most effective network suppliers need the latest equipment to get the full benefit from their service. Would a phone company without a manufacturing affiliate have to bargain on the outside for its equipment like every-

one else?

The key element remains whether Bell can be persuaded that entry into DP is worth casting off Western Electric. Up until now, the phone company has introduced terminals, such as the Dataspeed 40/4, that operate with DP-type functions, and it has offered Transaction Network Service as a possible forerunner of more extensive services tailored to DP users.

With its features encroaching more and more into the DP area, Bell is much safer under the protective umbrella of regulation. AT&T has never said it favors full competition in nonregulated areas for itself. Perhaps it considers that too much of a business risk, even for a separate affiliate.

The features of the communications act concerning competition are obviously aimed at Bell. It remains to be seen how the phone company will react. More important, if members of Congress see this as legislation that threatens their communications carrier supporters, including Bell and the unions, the bill may never get passed, regardless of its merits.

Hearings scheduled to start in July will help determine whether this bill can reshape an area bogged down in regulations into a streamlined industry full of innovation and alternatives that allow users to get the business communications they need.

Application That Hits Home

Of the hundreds of applications one can read about in *Computerworld* every year, few have such a direct, positive impact on the little man as the recently implemented computer system in New York City's housing courts [CW, June 19].

In recent years, tenants have threatened to withhold payment of rent and in fact have withheld those payments as a weapon of last resort when necessary repairs have not been made on their apartments. This action has landed many tenants in court as defendants in suits charging nonpayment.

It is difficult for the tenant under such circumstances to gather much evidence against the landlord except for the few items in dispute within the tenant's own apartment.

Now, however, with the computer terminal right at the bench, the housing court judge hearing a case

can access a data base of information maintained by the city on each landlord and his buildings, including such data as the number of complaints against his properties, the number of code violations uncovered by city inspectors and whether the landlord is up-to-date in his tax payments. The judge can determine pretty quickly what kind of landlord he has before him and whether the tenant has a legitimate reason for withholding rent payments.

Under consideration is a very useful by-product of the system — a plan to sell computer printouts of the housing data to make public information on the buildings in the city and to encourage potential litigants to act.

This could go a long way toward making landlords live up to their end of lease agreements, providing better living conditions.

Data Past

Five Years Ago June 27, 1973

NEW YORK — In one of its strongest moves to date, the Justice Department asked Judge David N. Edelstein to impose stiff civil and criminal penalties against IBM if it continued to refuse to turn over documents to the government for its antitrust action.

Eight Years Ago July 1, 1970

WASHINGTON, D.C. — An investigation by the National Bureau of Standards found that the noise levels in computer centers were frequently of sufficient magnitude to cause permanent hearing damage in addition to "relatively simple errors by programmers."



'Guess What — This One's Empty, Too!'

Letters to the Editor

'Congratulations, Wisconsin'

Concerning "Wisconsin Kills 4% Sales Tax on DP Services" [CW, June 12], congratulations to all data processors in Wisconsin, especially to the members of Cute and specifically Glenn Jacobson.

The repeal of the unfair tax is another link in the chain that our industry is forging to solidify our stand throughout the country on this issue. As national coordinator for the Data Processing Management Association's (DPMA) Sales Tax Subcommittee, I am most encouraged by the "grassroots" effort (as exemplified in the Wisconsin case).

With recent victories in at least six states, we are an active force that state legislators and taxing authorities now respect.

Steve Vajda
Miami, Fla.

DP Studies at Southwest Texas

The computer scientists of the Department of Mathematics at Southwest Texas State University are concerned that *Computerworld* readers may form an inaccurate and negative impression concerning the philosophy and structure of computer science studies on our campus ["DP Graduates Lack Business Savvy: Survey," CW, May 8, and "A Sad State of Confusion," CW, May 22].

The Department of Mathematics offers a B.S. degree in computer science which is modeled after the Association for Computing Machinery's Curriculum '68. We also offer a teaching field in computer science, a graduate [M.A./M.S.] minor, and hope soon to offer the M.S. and M.A. degrees in computer science.

The Department of Accounting and Computer Science offers a

bachelor's in business administration with a concentration in computer science and a bachelor's degree in management information systems.

Grady Early
S. Gene Crossley
Southwest Texas State University
San Marcos, Texas

Federal Government and DP

The front-page article "Government Treating DPers Ineptly" [CW, June 5] mentioned, in passing, the "noncompetitive [government] salaries for [both] entry-level programmers and highly technical jobs..." All too often, such statements go unchallenged and are accepted as fact by an uninformed public.

Our firm specializes in recruiting computer professionals. During the last 10 years, our Washington, D.C., area office has been extensively, and exclusively, involved with the local employment marketplace. Based on our observations, the federal government has consistently been more than competitive at all computer industry hiring levels except top management. The entrenchment of present management is the source of that problem.

David Samuelson
Quest Systems, Inc.
Washington, D.C.

Preventing Privacy Abuses

Matching welfare rolls, tax rolls and payrolls should not pit efficiency against privacy. Corporations and tax agencies, which lend their files to welfare agencies, should first delete personal details.

The loan of a bare list of numbers, names and addresses of taxpayers or employees whose income exceeds welfare eligibility would prevent abuse.

Richard H. Shulman
Bronx, N.Y.

The Human Connection

Listening Skills Key to Understanding Users

By Jack Stone
And Ida Mason

Special to CW

Yet another of the bewildering contradictions within our bizarre business is the use of ambiguous communications between the user and the analyst as the basis for systems design and programming. While everybody agrees that information systems development is an area in which there is no room for communications ambiguity, how often have you completed a conversation with one of your compatriots about a technical matter and felt you weren't really sure you made your point or you weren't completely certain you understood the other person's position?

We submit that what's lacking in the user/analyst dialogue is the capability for each of the parties to listen.

You see, most people have relatively little difficulty speaking to others since there is some measure of ego-display involved. But to listen, and listen closely enough to derive meaning and understanding, requires a temporary restraint on one's ego forces, and many are reluctant to exercise that restraint.

Ida Mason recently attended an

informative seminar on business communications presented by Barbara Gennett of the Deerborne School of Coral Gables, Fla. Gennett's views include some interesting and practical insights which may have value to the information system community. Here is Ida Mason's report on the seminar highlights:

In today's world, it is the spoken word, not the written word, which is the most influential medium of communication. In less than 100 years, we have progressed from Alexander Bell's primitive telephone to worldwide satellite communication systems that transmit telephone conversations, television pictures and digital data instantly between continents. Yet with all these communications facilities available to us, it is ironic that, on occasion, little information content is actually transported.

This may be the age of electronic communications services, but it is also the age of serious gaps in understanding. There are well-known and critical gaps between parents and children, between governments and governed, between nations and between races. Despite the many aids to human communi-

cations, we too often fail to convey our ideas to others or get their ideas from them.

Communications Snags

Let's briefly examine some of the problems that we encounter in oral communications.

Most people pay only "selective attention" to what they hear, in that they listen most closely to ideas with which they already agree.

It should be no surprise that people are not open to all points of view. Democrats listen to Democratic speakers. Businessmen listen to the businessman's point of view.

When we encounter ideas we don't like, we sometimes reinterpret them to make them conform with our own notions. We humans also show a greater ability to remember material that agrees with our position and forget material that opposes it.

Other difficulties arise when spoken words call up the wrong images in the listener's mind. Obviously, the meaning of words depends on both familiarity and the feelings that are aroused. For example, the word "citation" could mean either merit or traffic ticket, depending on our past experiences.

Then there are the confusion factors sent via nonverbal communications, gestures and facial expressions. Unintended meaning may be conveyed from a listener's smile or frown or seemingly indifferent stare. Or a speaker may say he is requesting something when his expression and posture suggest he is really demanding it.

We should realize that in all phases of our life — at business, in the home, during recreation periods — our experiences are vastly different. For successful communications, we must listen carefully. We must be very tolerant and patient in trying to understand the viewpoints, and ideas of others.

We must nurture curiosity. We must want to discover and learn from the experiences of others. Although it is rare to find a speaker with the final truth, it is just as rare to find a person who doesn't have something significant to say.

John Culkin's comment certainly applies to all walks of life: "Communication consists not in saying things but in having them heard."

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Taylor Report

'Claims-Made' Insurance Covers DP Malpractice

By Alan Taylor

Special to CW

I recently commented about the DP errors and omissions policy of one of the major insurance companies [CW, June 12]. Now I have received a copy of a very different policy — a real malpractice policy for DPer.

Tully of America, Inc., headquartered in Indianapolis, Ind., tells me it has just started issuing the policy, having recently gotten backing from some of Lloyd's of London's underwriters. The firm's background is in malpractice in general, rather than in DP.

It's worth commenting on the policy's provisions.

'Claims-Made' Coverage

There are two types of basic malpractice insurance, the "occurrence" type and the "claims-made" type. Under the first type, coverage is generally provided for any act or omission that occurs during the policy period, regardless of when the claim is made. By contrast, the "claims-made" type offered by Tully covers the claim regardless of when the problem occurred.

Naturally, there is a requirement that denies coverage for prior acts if they are known and concealed at the time the policy was issued.

There seems to be a question as to the validity of the claims-made

policy in view of certain public policy considerations. The California insurance code asks for a prominent notice on the front page of claims-made policies bringing this question to the user's notice.

Claims-made policies usually cover something that has occurred, but for which a formal claim has not been made during the period. The method used to keep coverage going is for the professional concerned — doctor, lawyer or DPer — to give written notice of the occurrence of possible future claims before the policy's expiration.

The insured usually furnishes the insurance company with a list of every act and omission he reasonably considers may some day result in a claim and, of course, he keeps a copy of the list.

In fact, in deciding between policies it is particularly important to look at the termination situations, particularly why a company may unilaterally cancel or refuse to renew a malpractice policy. Usually the insured has the right, for some additional premium (such as 10% of the annual fee) to secure a limited extension of the coverage so that new coverage can be obtained.

The second major provision, coverage for errors and omis-

(Continued on Page 24)

Reader Commentary

Reader Explains Routine For Finding Julian Hours

By Richard Sternbergh

Special to CW

I recently developed a new Julian hour routine for use on the IBM 360 at my place of employment. Recalling a series of letters to the editor in *Computerworld* on this subject, I thought I'd share it.

It is based on the fact that there are approximately 365.25 days per year. The extra quarter days are incremented every four years. Therefore, the number of days between the beginning of this century and the beginning of any year is given by:

(Year is two digit year)
DAYS=YEAR*365.25

This result should be truncated to a whole integer.

The number of days since the beginning of the year until the end of the the previous month is best found in a table lookup, since the lengths of the months

number of days until the end of the last month would be:

DAYS=DAYS+TABLE(MONTH)
(Days from previous computation)
(Month is current month)

Adding yesterday's date (TODAY-1) yields the number of days since 1900. Multiplying by 24 and adding the hour (on a 24-hour clock, 0-23) gives the final result, the number of hours since the base data/time of Jan. 1, 1900, 00 local time.

DAYS=(DAYS+TABLE(MONTH)+TODAY-1)*24+HOUR

The only exception occurs when the date is itself in a leap year. The algorithm places the extra day between December and January, while the calendar makers placed it between February and March.

Therefore, we have to "postpone" its "addition" until after

(Continued on Page 24)

```
FUNCTION JULHR (YR, MO, DA, HR)
IMPLICIT INTEGER (A-Z)
DIMENSION MODAYS (12)
DATA MODAYS/0, 31, 59, 90, 120, 151, 181, 212,
243, 273, 304, 334/
JULHR=IFIX (YR*365.25)
JULHR=(JULHR+MODAYS (MO) + DA-1) *24+HR
IF (MOD (YR,4) .EQ.O.AND.MO.LE.2) JULHR=JULHR-24
RETURN
END
```

Julian Date Algorithm

and so on. The

Policy Aimed at DP Malpractice Protection

(Continued from Page 23)

sions against legal defense costs and damages, is fairly standard. However, the policy doesn't directly state what will happen if a malicious employee, who is reasonably supervised by the professional, actually causes the problem.

The policy's limits of \$100,000 to \$500,000 are probably reasonable at this time. The type of error a computer specialist can make can easily cause \$100,000 worth of damage.

The upper limit of \$500,000 might certainly be too low for a realistic situation, but it is a lot better than nothing.

Until experience has determined the extent of DPs' malpractice exposure and how it can be con-

trolled, it is reasonable to expect somewhat lower limits than those for other types of insurance for which the limits have been set by many years of experience.

The deductible is also a fairly standard amount. I'm not too happy about Tully's limits of \$2,500 to \$5,000. When the situation of a single programmer is compared with that of a software house, one or the other of these is too low or too high.

There obviously has to be a deductible, but a range of \$1,000 to \$10,000 would give a better feel for the real situation.

Potential Buyers

The most interesting part of the whole operation is speculating on

who will want such a policy. The Tully malpractice policy can be bought by software houses as well as by systems analysts, programmers and people who run service bureaus.

In each and every situation, this coverage will greatly improve the contractual situation of a person in modern-day business. More and more analysts and programmers are providing services as individuals, either directly to a client or by subcontracting. And more software houses are emerging as the real centers of activity, with the hardware selection being so rich that any of a number of mainframes is suitable. That good software should be able to move from one main-

frame to another while still retaining maximum efficiency.

Service bureaus or people providing services for others are also coming into their own as a result of networking and other communication methods. All these outfits have not been able to offer any really substantial coverage to their clients. Normally they have, in fact, used the overly severe contractual restrictions that originated with the 1960 contracts for hardware. Few of them even offer the \$100,000 maximum liability restricted coverage available from IBM.

Now these enterprises can beat IBM and show a competitive advantage by offering equal or better coverage limits — through an insurance policy backed by Lloyd's of London.

From a marketing point of view as well as from a professional point of view, I see malpractice policies assisting in providing the surety that people need before they will give their contracts out to software houses, systems analysts, programmers or processors. And, with these premiums, there are many outfits that could take the whole cost — \$300 to \$2,500 — in their stride.

How this particular policy will work out is anybody's guess. It will be interesting to visit with Tully in 18 months to two years and to keep a watch for other policies being offered in this area. You can keep track by reviewing the "Agent and Buyer's Guide," which your local independent insurance agent can get for you.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Reader Details Julian Routine

(Continued from Page 23)

February.

The code shown on Page 23 would implement the algorithm in IBM 360 Fortran IV.

The IFIX is used to indicate the truncation and storage of the REAL result into the INTEGER JULHR. This is not necessary as this compiler does that when attempting to store REAL into INTEGER. To emulate the MOD function in Cobol, divide YR by 4 with the REMAINDER option and test if the remainder is 0.

The function, as written is valid until midnight, Dec. 31, 1999; using a 4-digit year minus 1900 will increase its life to the year 2099.

Since centuries are leap years only when divisible evenly by 400, any further extension requires another decision, eliminating the leap day in the years 2100, 2200, 2300, 2500 and so on. Since this won't be needed for 122 years, the overhead was deemed unnecessary.

Regarding storage requirements, all variables could be halfwords (or two to three decimal digits minimally) except for JULHR, which requires a fullword or seven decimal digits (the end of 2099 is 1738847 Julian hours).

JOIN the switch to Western Telematic

Did you know?

That WTI has expanded its family of RS 232 Compatible Floppy Disk products by announcing its latest addition... THE DATAMATE MINI FLOPPY DISK TERMINAL!

- Over 71,000 characters of storage.
- Two search modes.
- X-On / X-Off compatible.
- Powerful editing capabilities.
- 8 bit binary feature.

Did you know?

That WTI was the FIRST company to ever manufacture an RS 232 Compatible Floppy Disk Terminal... THE DATAMASTER II.

- Over 311,000 characters of storage.
- X-On / X-Off compatible.
- Easy to use text editing system.
- Quick search capability.
- Excellent word processing features such as automatic letter writing.
- Communication — Batch and Interactive modes.

Did you know?

That WTI is the ONLY company to offer all three — the Mini Floppy, the Single Drive Standard Floppy, and the Dual Drive Standard Floppy in its product line — each capable of transmission speeds from 110 to 9600 baud.

- 622,000 characters of storage.
- Data can be copied from one disk to another.
- Each disk can be independently selected or automatically linked.
- Powerful text editing capabilities.

WESTERN TELEMATIC, INC.
2435 ANNE ST.
SANTA ANA, CA 92704
(714) 979-0363

- ☐ Send product literature and prices.
- ☐ Have a representative call.

For dealer information call Mike Teague, National Marketing Manager



The advertisement features three images of computer terminals. The top image is the 'DataMate' Mini Floppy Disk Terminal, a small unit with a screen and keyboard. The middle image is the 'DataMaster II' Single Drive Standard Floppy, a larger unit with a single floppy disk drive. The bottom image is the 'Dual DataMaster II' Dual Drive Standard Floppy, a unit with two floppy disk drives. Each image is accompanied by a list of features and a 'Did you know?' fact.

Another UK Offering CIS Cobol Extensions Aid Small Sites

LONDON — The Compact Interactive Standard (CIS) Cobol compiler now available from Micro Focus Ltd. for use on Intel 8080 and other microcomputers and small business systems was described as a subset of the ANS Cobol 74 specifications with extensions particularly useful for interactive DP.

The enhancements provide for interactive working, program control of files, text file handling, rapid development and testing, a

spokesman explained.

These facilities permit the programmer to specify everything for the application from one place, the Cobol program itself. For example, the spokesman said, all operational control is inside the program; there is no need for external job control definition or screen definition.

In particular, CIS Cobol provides advanced screen formatting and data entry facilities, runtime input of file names, line se-

quential files and hexadecimal literals, he noted. Upper and lower case printouts are also possible, providing easy reading of reports, he continued.

During development, compiled programs can be loaded directly by the runtime system "fast load" facility, avoiding time otherwise spent in linking. The compiler is said to accept its own list file as source code so the user can develop programs quickly and easily from the CRT.

Interactive debugging is said to permit the setting of breakpoints, along with the examination and modification of memory locations as those points are reached during execution. Each Cobol statement is identified by a four-digit hexadecimal number, the spokesman noted.

The single-pass compiler is available in two forms, as a single monolithic program suitable for residence in read-only memory (ROM) or as an overlaid program, suitable for a disk-based system but taking a minimal amount of memory. The overlaid version consists of a base module and three overlay modules which are loaded successively during compilation, he said.

End users can acquire the overlaid version, distributed on a floppy disk, for \$500. A range of supporting programs, including a sort and the ROM-based compiler, are available at additional cost.

Micro Focus is interested in establishing U.S. distributorships, the spokesman added from 18 Vernon Yard, Portobello Road, London W11 2DX, England.

Meeting This Week to Show Broad View of Productivity

ARLINGTON, Va. — The Second Annual Conference on Computer Systems Productivity, to be held at the Ramada Inn Rosslyn here Wednesday, Thursday and Friday of this week, will focus on both people and machine factors, according to general chairman Kendall E. Burroughs of the U.S. Chamber of Commerce.

The keynoting chores, for example, will be shared by Arthur Kirsch, vice-president of Citibank, who will discuss "Integrating Computer Systems Into the Organization," and *Computerworld* columnist Jack Stone talking about "Enhancing Productivity Through the Human Connection."

Structured Analysis

Wednesday morning will end with a session on structured analysis chaired by Dr. Thomas E. Kirchgessner of the University of Southern California and a luncheon talk by John C. Collins of General Scientific, Gaithersburg, Md.

The first afternoon will include two concurrent panel discussions, one focusing on distributed systems made up of minicomputers and microcomputers, the other on "Efficiency in Data Center Management." Thursday morning will follow the same pattern, with sessions on simulation to increase productivity and computer performance measurement.

Albert Eisenstat, vice-president of Tymshare, will speak on time-sharing in the 1980s at Thursday's luncheon, and a trio of concurrent sessions will fill in the afternoon. Subjects to be covered will be "Security and Privacy in Information Systems," "Managing Human Resources" and "Auditing the Computing Function."

'Update for Professionals'

Friday morning will start with three addresses under the general title "Update for Professionals" and end with two more under the umbrella "Waves of the Future."

The update sessions will include Assistant Prof. Donald V. Steward of Virginia Commonwealth University on "Use of the Computer to Define Systems Structure," Richard A. Mackay of the Federal Home Loan Mortgage Corp. on "Development of a Data Processing Steering Committee" and Dr. Donald Fitzpatrick of Arthur Young & Co. on "The Integration of the DP Function With Organizational Goals."

Presented by the Institute for Professional Education, the conference costs \$325/person, including lunches and all meeting materials but not hotel accommodations.

The Ramada Inn Rosslyn is at 1900 N. Fort Myer Drive, a spokesman noted from the institute's headquarters across the street at 1901 N. Fort Myers Drive.

'Resolve' Update Introduced; MVS Support Downplayed

SUNNYVALE, Calif. — Reversing a trend in many package upgrades, Release 1.3 of the Resolve computer operations support system from Boole & Babbage, Inc. is specifically directed at enhancing its use on non-MVS systems.

The package already included a number of services to help MVS and other IBM OS and OS/VS users eliminate system problems which, unresolved, cause sluggish performance and, in a number of cases, unscheduled "crashes" followed by IPLs, a spokesman said.

Under the latest release, however, the VS1 user's ability to run Resolve outside a partition was described by the spokesman as a major enhancement. This facility makes it possible to begin using Resolve without disrupting job scheduling or class and partition assignments, he explained.

Another extension provides five functions

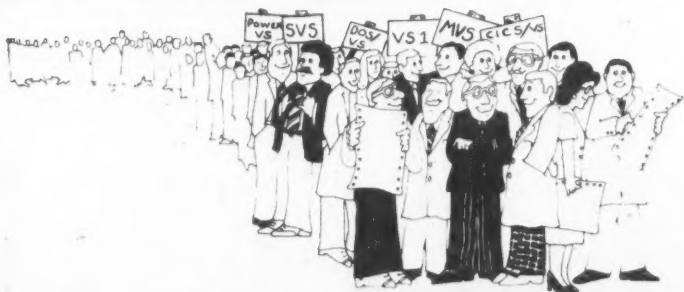
directed toward the users of IBM's Time Sharing Option (TSO). This service can be used to examine the status of TSO users, their CPU swapping, occupancy time and main storage usage, the spokesman noted.

A "Buffers" function permits the TSO user to evaluate the availability of buffers and their effect on system performance. A "Regions" function displays TSO user queue status and a "Locations" function provides systems programmers with access to the addresses of key TSO control blocks.

The overall TSO support will supplement Resolve's other capabilities and further enhance the user's ability to communicate with the operating system and determine job and system users' status, the spokesman added.

Depending on system and site requirements, Resolve costs \$5,000 to \$21,000, he said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

**You're in good company with
the Johnson Job Accounting Report
System used by more than
1,000 D.P. Managers.**



SUPPORTS:

MVS-SVS-VS1-DOS/VS-POWER/VS-MVT-MFT-CICS/VS-IMS/VS-HASP

Tell us what areas you're interested in!

- | | | |
|---|---|--|
| <input type="checkbox"/> Job Accounting | <input type="checkbox"/> Budget Control | <input type="checkbox"/> Resource Utilization |
| <input type="checkbox"/> Cost Distribution | <input type="checkbox"/> Thruput | <input type="checkbox"/> Programmer Efficiency |
| <input type="checkbox"/> Software Performance | <input type="checkbox"/> Customer Billing | <input type="checkbox"/> Job Scheduling |

Send for your FREE 30 page System Characteristics Manual

Name _____
 Title _____
 Company _____
 Address _____ City _____
 State _____ Zip _____ Phone (____) _____
 Computer _____ Operating System _____

C626

**Johnson
Systems, Inc.**

8400 Westpark Drive
 McLean, Virginia 22101
 (703) 893-8700

Editor Aids DG Users

ROCHESTER, Minn. — An editing system from CRR Associates dubbed Credit enables users working with RDOS-oriented Data General Corp. minicomputers to edit text at a CRT screen more easily than with DG software, CRR claimed.

Credit is said to support full screen — 24 lines of 64 characters each — context editing as well as complete mobility to move through a file forward or backward. Insertion or deletion of individual characters or entire lines is permitted with Credit, the spokesman said.

Lines can be copied from one file to another and between two places in the same file; the editor also supports string search and replace commands, he added.

The user has the ability to alternate editing between two independent files — or different positions in the same file — without losing his current location in either file.

Credit is provided on 9-track, 800 bit/in. magnetic tape in RDOS Dump format, he said, adding that the editor can be licensed for \$500.

CRR Associates is at 2120 67th St. N.W., Rochester, Minn. 55901.

'Secure/IMS' Guards Data From Invalid TP Accesses

SACRAMENTO, Calif. — Described as "maintaining 100% compliance" with the Privacy Protection Study Commission Report of 1977, Secure/IMS prevents unauthorized access to on-line IMS data bases through the teleprocessing (TP) network, according to its vendor, Software Module Marketing (SMM).

Attempted violations are reported by Secure/IMS within seconds, a spokesman claimed, adding that hard-copy audit reports detail all activity on the system by date, time, operator, terminal and type of work performed.

Operators are given customized menus that allow them to select and work on only those applications for which they are authorized. Operators may move from terminal to terminal, for example, in the event of hardware failure, he added.

Chargeback Billing

At the same time, the optional Transaction Billing System — also available

from SMM — interfaces with Secure/IMS to provide direct chargeback billing for specified cost centers. But billing is done only for those transactions controlled by Secure/IMS, the spokesman emphasized.

While Secure/IMS provides support for operators, auditors and management, it imposes no special burden on programmers. No changes in application program coding is needed to install Secure/IMS, he stated.

The Transaction Billing System utilizes the long-term history file from Secure/IMS and a cost schedule specified by the installation management. Costs are determined for individual transactions (or functions), areas supported by one or more functions and cost centers made up of areas.

Secure/IMS costs \$30,000. The Transaction Billing System is available for an additional \$10,000, the SMM spokesman said from the Crocker Bank Building Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'CAM' Eases Finance Plans

FAIRFIELD, N.J. — A comprehensive Capital Asset Management (CAM) system of interrelated modules is now available through the facilities of Rapidata, Inc., according to a spokeswoman for that remote computing services firm.

Described as a project evaluation and management tool for financial managers, CAM is composed of three major modules: Capital Budgeting and Analysis (Capbud), Capital Project Financial Analysis (CPFA) and Capital

Tracking (CPTrac).

Capbud is said to assist users in optimizing capital project returns and in assuring a project mix and risk profile consistent with a corporation's objectives, the spokeswoman said. Project profitability screening and ranking and consolidated, pro forma projections based on user-determined input are key capabilities, she noted.

CPFA assists the analyst in minimizing financing costs. It includes programs for both investment and financing analysis.

CPTrac monitors and forecasts project implementation costs to quickly spot overruns and minimize excess cash reserves, she continued.

The nationwide service is headquartered at 20 New Dutch Lane, Fairfield, N.J. 07006.

SPSS Available On Calldata Net

WOODBURY, N.Y. — The facilities of the Statistical Package for the Social Sciences (SPSS) from SPSS, Inc. are now available as a batch-oriented offering on the Calldata Systems, Inc. remote computing service network.

The package offers users a comprehensive set of procedures for data transformation and file manipulation and a large number of statistical routines commonly used in the social sciences, according to Calldata.

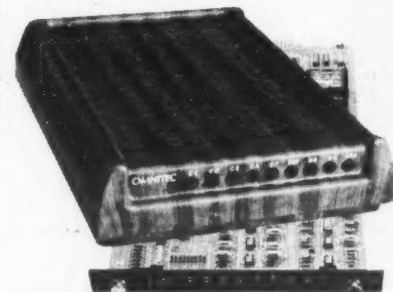
In addition to descriptive statistics, simple frequency distributions and cross-tabulation support, SPSS contains procedures for simple correlation, partial correlation, means for variances for stratified subpopulations and one-way or n-way analysis of variance, the spokesman said.

Multiple Regression

Other facilities are said to include multiple regression, discriminant analysis, scatter diagrams, factor analysis, canonical correlation and Guttman Scaling.

The data management facilities can be used to modify a file of data and can be used in conjunction with any of the statistical procedures, the spokesman added.

While its network facilities are available nationwide, Calldata is based here at 20 Crossways Park North, Woodbury, N.Y. 11797.



1200 BAUD MODEM

Omnitex Data's advanced 9202B Auto Answer Modem Systems are available for immediate delivery in rack cards or stand-alone configuration. Fully compatible with Bell protocols 202C, CR, D, S and T, the 9202B interfaces include DAA (automatic or manual), EIA RS232C compatibility and TTY current loop active. Fits standard 19-inch relay chassis or specify our 16-card rack cases.

For more information write Dept. 410 or call (602) 252-2083 collect.



OMNITEX DATA
"New Dimensions in Modems"

2405 South 24th Street • Phoenix, Arizona 85034

168

Wanted to buy!

Call Michael O'Connell at
COMDISCO (312) 698-3000
or your nearest COMDISCO office.

confused?

GET THE
COMPATABILITY
BROCHURE
FOR MAGNETIC
MEDIA

Compatibility

wabash

wabash

IT'S FREE! SO'S THE PHONE CALL

800-323-9868

WITH IDMS RELEASE #5 WE BIT THE BULLET IN DATABASE.

IDMS NOW HAS FEATURES NO OTHER DBMS CAN MATCH IN AN ON-LINE ENVIRONMENT.

- Guaranteed recovery during concurrent processing
- Outstanding performance
- Warm restart
- Multi-threaded
- Fully re-entrant
- Useable on all IBM 370 or equivalent computers

What these features mean is that you can now support very large tele-processing networks with very high transaction rates and know that the response times will be excellent and that IDMS (unlike other DBMS) will not permit "deadly embrace" when more than one user is updating the same record simultaneously.

No other DBMS gives the user this capability *and* performance, too. And this is true whether you use an IBM 370/115 or an MP 168. Other vendors can't do it without first rewriting the central version of their DBMS, as Cullinane Corporation has done with IDMS release #5, to make it the first of a new generation of DBMS.

We bit the bullet and did it, and now it's behind us. Our users, many of whom literally run their businesses or organizations with IDMS, need these capabilities to meet their needs for the future. In all cases they receive IDMS release #5 at no cost, and since it is fully compatible with IDMS release #4.5 there is no conversion cost.

This is why Cullinane Corporation continues to have the highest rating in vendor support among all DBMS. We support our users' needs, not just for today but for tomorrow.

Like to attend a free seminar on IDMS release #5? Use this coupon or give us a phone call. Learn more about IDMS — *the DBMS of the future.*

Send for complete information plus a schedule of free database seminars.

Use this coupon or call (617) 237-6600 to find out when the next IDMS seminar will be in your area.

Name/Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Tel. () _____ My computer is _____



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Package Aids Utilities

ANDOVER, Mass. — The unique requirements of utilities and the construction and energy distribution industries can be handled by the IBM 360- and 370-oriented Financial Reporting and Work Order Management System (FR/Woms) now available from Software International, according to a spokesman.

Major areas handled by FR/Woms are work order processing, performance reporting, project tracking and regulatory reporting. Generation of consolidated operating statements and support for budgeting are also highlights of the system, the spokesman noted.

The work order processing reportedly includes support for new construction and maintenance projects,

the handling of capitalization and transfer of funds and the recapping of life-to-date information for open work orders.

The performance reporting facilities utilize a data base containing up to 10 years of experience, which can be used for trend monitoring while the project tracking feature highlights projects costing more than user-specified limits.

The spokesman also noted that the system handles Federal Power Commission 100 and 300 series accounting when that is appropriate.

The package costs \$47,500 for the DOS version and \$52,500 for the OS implementation. Software International is at Elm Sq., Andover, Mass. 01810.

Interdata Users Offered Multifunction Accounting

AUSTIN, Texas — An accounting package said to allow users of Interdata's 16-bit minicomputers to perform a range of functions without program modification, AIS-10, is now available from AIS Data Systems, Inc.

The package includes general ledger, accounts receivable and payable and payroll functions. The logic is tailored to the using installation when its chart of accounts is established, a spokesman noted.

Among the general ledger facilities is support for unlimited subaccounts, multilocation and departmental financial statements and unlimited source journals. Consolidations and closeouts are handled automatically and budget-

ing, comparative studies and job-costing reports are also part of the system, the spokesman said.

The accounts receivable subsystem can furnish either open item or balance forward statements, in addition to supporting finance charge calculation, statement cycling, group reporting, aging and detailed receivables reporting along with automatic posting of descriptions.

Payroll Subsystem

The payroll subsystem can deal with multiple pay rates; salaried, hourly and mixed earning periods in the same process; input overrides on pay rates or deductions; tax computation based on annualized earnings; and other "special situations," the spokesman claimed.

AIS-10 was designed primarily for small and medium-sized business environments, he said, pointing to support for prior period reporting "after a fiscal year has closed out" as an example of how "user-oriented" and "forgiving" the system is.

The package has been implemented on the Interdata 16-bit minicomputers and is scheduled for adaptation to the Texas Instruments, Inc. 990 environment as well. It is available for \$7,500.

AIS can also provide the appropriate hardware for "less than \$15,000," the spokesman said from Suite 101, 5511 Parkcrest, Austin, Texas 78731.

Program Tests Print Systems

ANAHEIM, Calif. — A program for testing the quality of virtually any printer that can be attached to an IBM OS or OS/VS system is now available from the Eon Co., according to a spokesman. The program is said to exercise all aspects of a printer's capabilities and clearly show any failure to the user.

No special knowledge is required, nor is any special setup needed; the test routine runs as a regular print job and the printer can be returned to regular production work as soon as the test is over, the spokesman said.

Breakdown Forewarnings

Used on a regular basis, the test routine can indicate when the printer is failing, before the breakdown occurs. It can also be used to compare print quality of different brands and models of printers, he suggested.

If the user is sure the printer itself is working properly, the Eon package can be used to test a communications network, documenting what was received, for example, for comparison with what was sent.

The package costs \$190. Eon can be reached through P.O. Box 6375, Anaheim, Calif. 92806.

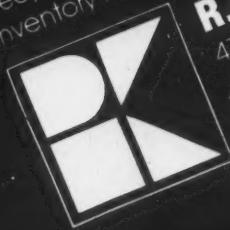
Correction

The UCC Three-Automatic Direct Access Management (Adam) package from University Computing Co. [CW, May 29] costs \$11,000 regardless of the environment in which it is to be used, not the \$15,000 originally reported, a UCC spokesman noted from Dallas, Texas.

**NOW! REDUCE COSTS
RENTAL LIKE
WITH AN RKE
SHORT TERM
OPERATING
LEASE.**

**• 3270 • 3340 • 3350 • 3420 • No Penalties
• No Buy-outs • Savings Over IBM Rentals**

Our short term, no obligation operating lease is the most effective way to increase total output and still maintain maximum cash flexibility. Talk to us. Let us tell you how we can purchase your installed tapes, discs and terminals and lease them back to you—OR—furnish equipment to you from our own inventory at a savings over the cost of renting from IBM. "WE" are the people at RKE who have the special knowledge, finance and inventory to meet your needs today.



R.K. ENTERPRISES, INC.
470 MAIN ST., RIDGEFIELD, CONN. 06877
America's leading
companies depend
on us.

Marketing Centers

SAM ROSSON
(214) 361-8337

BOB LEONARD
(203) 438-9567

DON BRADEN
(713) 367-7170

ALLAN HANN
(215) 667-6340

RICHARD BLOWER
(513) 793-7992

DEALERS PROTECTED



The reason Epoch 4 has made it big in Japan is because it deserved to.

Quality. It's the same in any language.

The quality of computer products like Epoch 4 will be found out as fast in Japan as anywhere on earth.

When we introduced Epoch 4 several years ago, we felt like we had a good thing. Now, after billions of

error-free passes have been made with Epoch 4, operators know they have a good thing.

And Japan — one of the world's leaders in electronics — is on to it. In a big way.

Epoch 4 is known everywhere for

its consistency and reliability. And it should be, because every reel is fully certified for use through 6250 CPI.

Epoch 4 is the patented one. The one that works as well on one side of the world as it does on the other.

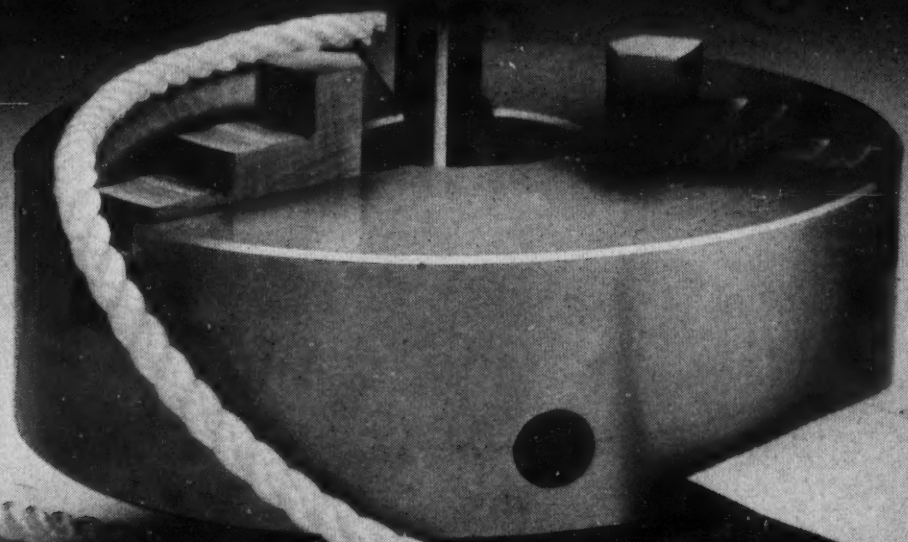


GRAHAM MAGNETICS *Proven around the world.*

Graham, Texas 76048



DISTRIBUTED PROCESSING: ONLY DIGITAL CAN MATCH YOUR MIX. AND NETWORK IT.



1. THE 80/20 REALITY.

If you remember nothing else from this ad, remember this: Networked computers do 80% of their work for local users. (After all, that's the whole purpose of distributed processing.)

2. THE SIGNIFICANT POINT.

It follows that the efficiency of any network is 80% a function of how well local computers do local jobs. And this leads to the significant point about DECnet, the only second generation networking software in the industry. Only with DECnet and Digital computers can you build a network that's optimized at every node.

3. EFFICIENCY AT THE LOCAL LEVEL IS NO MEAN TRICK.

Every company has a great variety of different jobs that computers must do, but no two jobs are exactly the same. You need one kind of system for

interactive applications like order entry. A completely different kind of system for real-time applications like running a lathe. It has to follow that no computer company can even begin to talk about "optimizing your network" unless it can give you a choice of computer systems as varied as your list of tasks.

4. NOW, TWO CRITICAL QUESTIONS.

Ask your computer company two things: "Can you provide a complete range of systems in all the essential computer categories? Can you network those computers together without regard to word length, operating system or language?"

5. ONLY DIGITAL ANSWERS "YES" TO BOTH QUESTIONS.

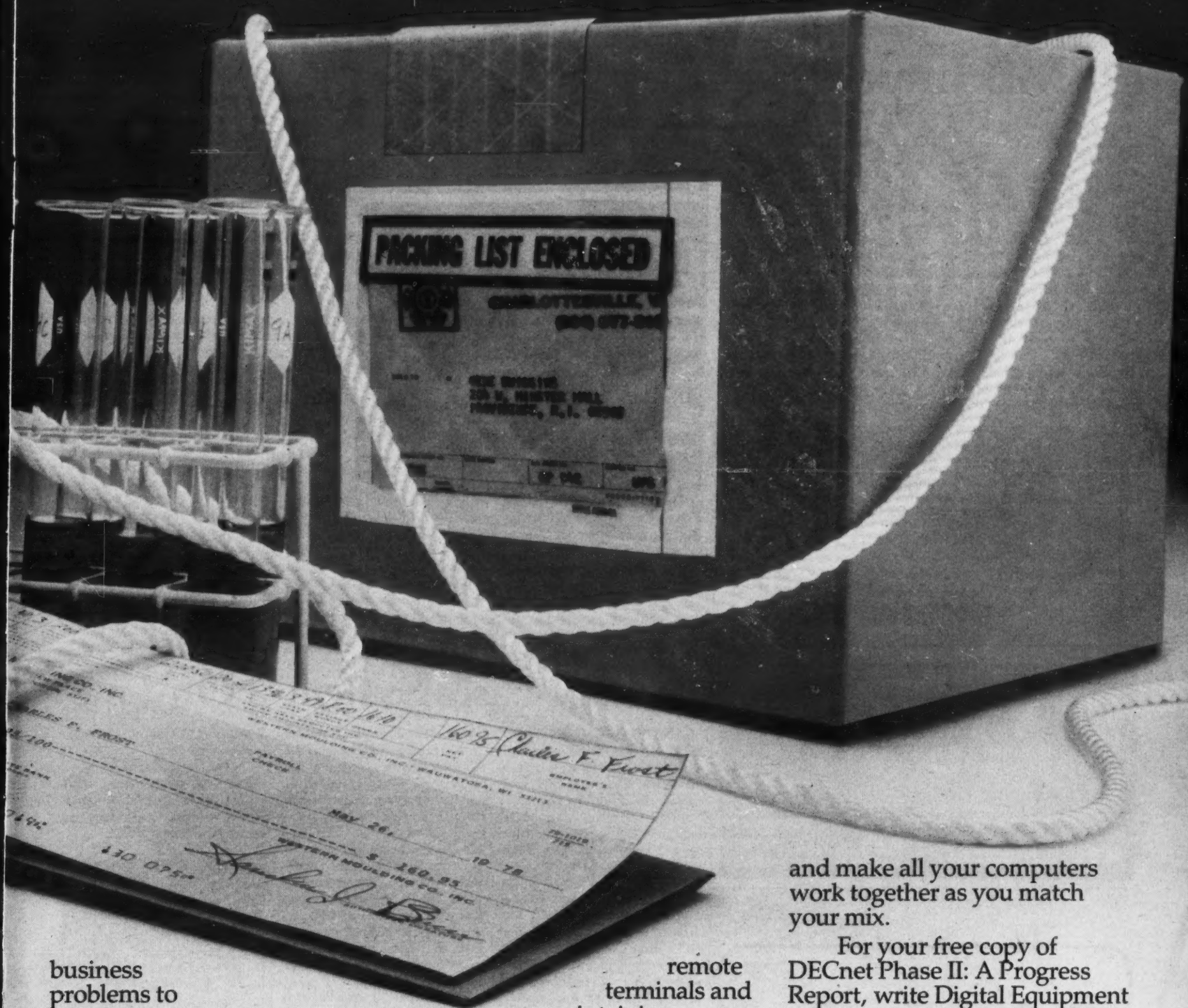
Digital built a billion-dollar business by making specific products for customers with specific needs. Today Digital is

the only computer company that builds all four essential categories of computer systems, and it's the only company that allows you to join these systems in a network where every node matches the local application in functionality and price/performance.

6. ONLY DIGITAL CAN NETWORK ALL THESE DIFFERENT SYSTEMS TOGETHER.

Small real-time systems in 12- and 16-bit architectures with a wide range of operating software to monitor and control ongoing events. Many of these systems have been optimized for specific applications including interactive graphics, production control, laboratory analysis, and data collection and processing.

Massive real-time computational systems like 32-bit VAX-11/780 can be configured to handle everything from complex scientific, engineering and



business problems to simulation, large-program runs, and other applications requiring high input-output traffic in multi-user environments.

Small timesharing systems designed for the office, warehouse or laboratory with a wide choice of architectures and operating systems tailorable to many different multi-user and multi-task applications.

Interactive mainframe systems. 36-bit DECsystem 20's provide the power and flexibility to handle a wide range of business applications and scientific tasks for a number of interactive and batch users simultaneously while supporting a large number of

remote terminals and maintaining massive on-line data bases.

7. DECNET PUTS IT ALL TOGETHER.

DECnet, Digital's comprehensive networking software, supports general interconnectability of this complete range of distributed computer systems so you can exchange files, share data bases and other resources,

and make all your computers work together as you match your mix.

For your free copy of DECnet Phase II: A Progress Report, write Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754. Attn: Communication Services (NR-2/2). European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

Please tell me more about how DECnet and Digital computers make the best and least expensive distributed networks in the world.

Name _____ Title _____

Company _____

City _____ State _____ Zip _____

Mail to: Digital Equipment Corporation, 146 Main St., Maynard, MA 01754.
Attn: Communication Services (NR-2/2)

CW6268

DBMS Impact Seen Unexpected by Managers

By Brad Schultz
CW Staff

ANAHEIM, Calif. — Management typically does not understand what the long-term impact of a first data base management system (DBMS) will be on its organization when it decides to "go data base." Nor does it usually make this decision on the strength of cost/benefit projections, even in cases where the choice eventually proves justified.

Panelists reached that consensus based on their personal experiences as DBMS users at

a recent National Computer Conference session here entitled "Making the Decision to Go Data Base."

The U.S. Forest Service acquired its first DBMS piecemeal in response to diverse and somewhat independent demands for data generated by fluctuations in federal land use policy, according to Jon Kennedy of the government agency.

Chemical Bank of New York's highest officers decided to adopt a system with a leap of faith in its "pleading" DP management, rather than on

the basis of cost/benefit analyses, the bank's Frank Korahais indicated. Richard Schubert of B.F. Goodrich Co. remarked this was also true of his firm's DBMS procurement.

Obvious Need

The panelists seemed to agree that a valid long-term cost/benefit projection is nearly impossible to make in evaluating such systems, although it may be obvious when some sort of DBMS is called for in the life of an organization.

For example, Chemical Bank's central DP section found itself besieged by demands for different types of data manipulation. The nation's sixth largest bank with about \$30 billion in assets, Chemical needed "grass roots" information for its four principle divisions — corporate finance, international finance, personal services and trust banking — and the DP section began meeting this need with a DBMS structured

according to function, Korahais explained.

Resistance Expected

Management should expect some resistance to the incorporation of a new DBMS on the part of some personnel, Schubert warned. Many people cannot conceive of performing their jobs in alternative ways and management may find a "moving around" of employees justified, he explained.

At Goodrich, a number of high-level administrators had to be removed before the firm's new system could be applied smoothly, Schubert recalled.

An important consideration in selecting a DBMS is whether data must be immediately up-to-date, Schubert continued, noting that in some applications, "instantaneous" on-line updating is needed while in other cases a dated memo scheme is adequate.

There is some controversy about the extent to which data must be centralized within a

large financial institution, Korahais said, noting that Chemical favors a much more centralized arrangement than does Citibank.

The people who operate a DBMS as system analysts should be able to work well with personnel untrained in computer technology and should recognize and appreciate what expertise other personnel do have, which might often be critical to the success of certain applications, Schubert said.

Student Stress

The session's chairman, Prof. James McKenney of Harvard Business School, remarked that the aspiring data base administrators among his students are often assigned "real world" problems in data base management without any opportunity for feedback from others. These students then learn the frustration of confinement to their own perspectives, McKenney said, and discover that "reality does not come in tidy little boxes."

COMPUTER INTERFACE TECHNOLOGY

BUY-SELL-TRADE □ WE'RE THE BEST IN THE WEST
FOR DEC, DG, INTERDATA EQUIPMENT
SAVE 10% to 50% ON YOUR MINI NEEDS
THIS MONTH'S SPECIALS

PDP-11 32KB Memory, New\$975
Shugart SA800/1 Drive, New\$450
CDL-11 A,B,C,D,E, Async Interface, New ..\$420

2080 South Grand, Santa Ana, CA 92705
Hot Line (714) 979-9920
BROKER-DISTRIBUTOR-MANUFACTURER

End Users: Call ICE for Price & Service

DEC	Lear Siegler	Texas Instr.
DECwriter II LA 36	ADM 1A	745 Portable
DECwriter III LS 120	ADM 2	743 KSR
DECscope VT 52	ADM 3A	765,763 Bubble

Factory Distributor—We stock and service nationally
Consultation • Training • Installation • 17 years Experience

ICE 772 N. Church Road
Elmhurst, IL 60126

800-323-2288
In Illinois call 312-279-1960

Before You Buy

MAKE THIS COMPARISON

FEATURES	ER-10/3	ER-20/3	PDP-11T03*
CPU	LSI-11*	LSI-11	LSI-11
MEMORY	32 KB	64-KB	32-KB
DISK STORAGE	10 MB	20 MB	7.5 MB
CONSOLE	CRT or LA-36	CRT or LA-36	CRT or LA-36
PRINTER	NO	180 CPS	NO
SOFTWARE	RT-11*	RT-11	RT-11
DELIVERY	STOCK	STOCK	ASK DEC
PRICE	15,500	19,900	19,900

*Digital Equipment Corp. TM

We are the largest computer dealer in the South and offer IMMEDIATE delivery on 300 LPM Printers, Decwriters III, Floppy Disks, Modems and CRT's.



EQUIPMENT RESOURCES, INC.
1175-4 Fleming Street, Smyrna, GA 30080
1-800-241-9960, In Georgia call (404) 434-1382
COMPUTER SYSTEMS AND EQUIPMENT

Package Eases System/3 On-Line

SANTA ANA, Calif. — Any IBM System/3 Model 8, 10 or 12 can be on-line in a matter of hours while still retaining full batch capabilities with the Super 3 software and controller package now available from Memorex Corp.'s Business Systems Division, according to a spokesman.

The package utilizes a local display controller (LDC) and an information display system (IDS) that allow the System/3 to go on-line in only two steps, file definition and screen format design, he claimed.

Although times may vary with the size of the records and number of fields to be displayed, a typical screen formatting can be done in about 30 minutes, he said, adding that system generation, conversion and recompilations are not necessary.

Book Discusses

QA Teams in DP

WELLESLEY, Mass. — A methodology for implementing a quality assurance (QA) function in DP organizations is presented in a book just published by Q.E.D. Information Sciences, Inc.

Entitled *Effective Methods of EDP Quality Assurance*, the 340-page publication is said to offer a "how to" approach, bolstered by a sample QA manual.

The book costs \$28.50 (\$24.50 prepaid) plus \$1.50 for postage and handling. It is available from Q.E.D. at P.O. Box 181, 141 Linden St., Wellesley, Mass. 02181.

In operation, Super 3 enables on-line, full security use of the System/3 for file inquiry, file update and data entry while batch processing is performed simultaneously, the spokesman asserted.

In system resources, too, Super 3 outperforms IBM software, the spokesman continued. IBM's Communication Control Program (CCP) requires about 48K of memory, but the Memorex software runs in only 10K to 16K bytes, he said.

The Super 3 package is available for lease or purchase. The lease cost on a three-year plan will be about \$125/mo for Memorex's local display

adapter (LDA) and \$100/mo for the software.

The software can be used with an LCA/3271 and a LDA from IBM, the spokesman added from 3015 Daimler St., Santa Ana, Calif. 92705.

Finances Run On PDP-11s

SUNNYVALE, Calif. — An on-line financial accounting system for use on Digital Equipment Corp. PDP-11s running under RSTS/E, FS-11 is now available from NCA Corp.

The system is made up of five subsystems integrated so one entry of data is carried through all appropriate operations, according to a spokesman. Currently available subsystems include order entry, sales analysis, accounts receivable, general ledger and accounts payable.

FS-11 costs \$15,000 for the first module, \$6,000 for each additional one, NCA said from 388 Oakmead Parkway, Sunnyvale, Calif. 94086.

BLIS/COBOL

MULTIUSER OPERATING SYSTEM

Writing interactive

FINANCIAL APPLICATIONS

for mini's
has never been easier

For information call today

IPI Phone (305) 647-2200 USA
TWX/Telx 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

MODEMS

Tested... Full Warranty

4800 bps

Paradyne - M 48

- Automatic Equalization
- Unconditioned Lines
- Self Test and Remote Test Features
- Dual 2400 bps Operation Optional

Special Price \$1,478.00 or

\$55.00 per month

Contact:

Data Processing Sciences Corp.
2327 Park Avenue
Cincinnati, Ohio 45206
(513) 961-0776

RAISED FLOORS

- New & Used
- Bought-Sold-Installed
- Alterations-Carpeting
- Carpet Applied on Site
- Parts & Service

CALL

201-891-2766 212-244-3100

R.C. PULIS

ASSOCIATES, INC.

Box 102 2 Penn Plaza
Wyckoff, N.J. New York City
07481 10001

You are invited to
The Annual Computer
Leasing Workshop
for Computer Users

"An Understanding
of Today's Computer Leasing
Complexities
Plus a Look at Tomorrow's
Opportunities"

Seattle-July 12th

HOSTED BY

Mordecai Weissman, President
Myron S. Goodman, Executive Vice President

OTHER SEMINARS

**Denver-July 19th
Houston-July 20th
Pittsburgh-July 25th
Detroit-July 26th**

R.S.V.P. Ms. Ofelia Loret de Mola: 1-800-221-2674, 1-212-747-0220

OPM THE
CUSTOM LEASING
PEOPLE

O.P.M. Leasing Services, Inc.
71 Broadway, New York, N.Y. 10006

DBMS Setup Snags Held Usually Nontechnical

By Don Leavitt
CW Staff

ANAHEIM, Calif. — Most of the problems encountered in implementing a data base management system (DBMS) are not really technical, but that often makes them all the harder to solve, according to Hank Herre, manager of technical services or Fibreboard Corp. of San Francisco.

Appearing on a recent National Computer Conference panel here concerned with "Getting Ready for Data Bases," Herre urged anyone going into DBMS to understand, first of all, why a system was

selected by their individual organizations.

The setting is quite different, he noted, if the choice was made because the company just wanted to keep up with the Joneses or if the selection was based on a serious evaluation of the system's capabilities.

Once the commitment is made, it has to be sustained, Herre continued. Because a data base system should be a model of the using organization itself, it could cause real strains that only strongly committed people could handle, he said.

In shaping the model, the data base people may well spot inconsistencies in the way the organization works. If that happens, those inconsistencies must be aired, discussed and resolved. Otherwise, the whole exercise is worthless, he warned.

Although he said he couldn't vouch for the absolute dollar amounts, Herre said he feels quite comfortable with the idea that for every dollar spent in implementing a DBMS, a corporation would easily have to spend \$100 to back away later, whether bailing out of data base altogether or switching to a different system.

Political Problems

There are — or can be — strong political problems in the initial implementation,

Herre cautioned. "Inevitably, someone will raise the question of who owns the data" along with the more serious concerns about who is responsible for maintaining it.

But someone has to make decisions, and they have to be sensible; it isn't necessarily wrong to round figures going into a sales analysis report to the nearest \$100, for example, but figures used in accounts receivable and accounts payable "better be a lot more precise than that," he said.

In simple terms, "the best message I can leave with you," Herre concluded, "is to take your time. Time is the one thing that doesn't cost much. Use it, but use it wisely."

Panelist Jim Emerson, now with Peat Marwick Mitchell and Co., recalled his experi-

ences at Norwalk, Conn.-based Burndy Corp., and his message was much the same as Herre's. Start by recognizing the major entities in the organization, what their processing needs are and what effect that processing has on the data entities and the organization, he urged session attendees.

The choice of the first application is important, psychologically for the implementers and politically for the organization. He said it should be a visible application, but not a complicated one.

It is better, he added, if the activity to be supported is peripheral to the corporation. "But don't pick something that is too trivial" — that makes the whole of DBMS seem trivial, he explained.

Available Immediately For
SHORT TERM LEASE
370/138 370/148 370/145
3330's and OEM 3330's
360/30 360/40 360/50 360/65's
Greyhound Phoenix ICA's
CALL US COLLECT

United States
Austin
Boston
Chicago
San Francisco

Ron Geil (512) 451-0121
Tom Ryan (617) 272-8110
Dave Bays (312) 298-3910
Dave Hyland (415) 283-8980

International
Canada
Mexico
Eurasia (U.S. inquiries)
U.K./Europe
Austro-Asia

Don Maunder (Toronto) (416) 366-1513
Andres Contreras (905) 543-6850
Don Haworth (Dallas) (214) 233-1818
Joe Gold (Geneva) (022) 61-27-54
John Hallmark (Dallas) (214) 233-1818

Non-IBM:
UNIVAC or
CDC only)

John Hallmark (Dallas) (214) 233-1818
Don Haworth (Dallas) (214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

TEXAS INSTRUMENTS
MODEL 765/ PORTABLE ASR
WITH BUBBLE MEMORY

NOW IN
STOCK
FOR
IMMEDIATE
DELIVERY



AVAILABLE FROM STOCK
T. I. PORTABLES
T. I. ASR & KSR
ADDS CRTS
DATA GEN. TELEPRINTERS
DECWRITERS
DIABLO PRINTERS
FLOPPY DISKS
TECHTRAN DIGITAL RECORDERS

**Westwood
Associates, Inc.**
DATA COMMUNICATIONS EQUIPMENT
1442 Broad Street, Bloomfield, N.J. 07003

(201) 338-0200 (212) 964-3018 Philadelphia Area (609) 829-7280

'Jars' Adds Graphics Output

McLEAN, Va. — Release 3 of the IBM OS-oriented Job Accounting Report System (Jars) from Johnson Systems, Inc. includes an additional set of system use reports and "significant" enhancements to the basic package, according to a spokesman.

The extended capabilities are said to be particularly valuable to the OS/MVS user. All the relevant data captured by the MVS implementation of IBM's SMF is now "readily

available" through Jars, both in the system use reports and as data elements in Jars report program, he explained.

Jars has been described as a comprehensive computer utilization reporting and billing system, tracking the DP environment and related activities. The system provides an accounting of all system resource use to assist DP management in financial control, operations monitoring, systems tuning and resource

planning, the spokesman said.

The newly available system use reports are a set of graphs and tabular printouts which amplify the basic usefulness of Jars, he added. They were designed to help profile system utilization, identify trends and plan future workloads and resource requirements.

Although Johnson provides control cards to trigger production of what it feels are a good basic set of reports, the system also includes facilities by which the user can create report formats or modify existing ones.

OS Jars costs \$8,000, the vendor said from 8400 Westpark Drive, McLean, Va. 22101.

'Earl', 'Datacom' Tied

DALLAS — The Easy Access Report Language (Earl), a nonprocedural retrieval facility originally developed in Europe, is now available to users of the Datacom DB/DC systems from Insyte Datacom Corp.

(Packaged as CA-Earl, the software utility is also available to the general IBM DOS, OS and VS user community from Computer Associates, Inc. in New York and from various affiliated companies in Europe.)

Using Earls' English-style, free-format command repertoire, the user can access both data bases and conventional files to produce reports on a regular production basis or in response to one-time requests, an Insyte Datacom spokesman said.

The software allows up to 15 control breaks per report and as many as 15 reports to be generated from a single run of the program. Spacing, page control, page headings, column captions and total and subtotal identifiers are all handled by Earl once specified by the user, he noted.

The utility can handle eight sequential or Isam input files and these may be on card, disk or magnetic tape, he added.

Earl is available for \$7,500, Insyte Datacom noted from 325 Oak Plaza Bldg., 3707 Rawlins St., Dallas, Texas 75219.

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME
caused by field conversion

We will purchase your IBM 800 1600 BPI drives now & install 3420-4, 3420-6 drives immediately from inventory.

Call Nick DiBari
312-698-3000
or your nearest Comdisco office

COMDISCO

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

Fill out and mail this self-addressed postcard.

- ☐ Please send me more information on:
- ☐ Have someone call me about:
- ☐ UCC ONE (Tape Management Software)
- ☐ UCC TWO (DUO, DOS under OS)
- ☐ UCC THREE/ADAM (Disk Management System)
- ☐ UCC SIX (PDS Space Management)
- ☐ UCC TEN (IMS Data Dictionary/Manager)
- ☐ UCC FIFTEEN (Restart/Recovery Management System)
- ☐ UCC FCS (General Ledger/Financial Control System)
- ☐ UCC 40 (IMS Database Verifier)
- ☐ UCC 41 (IMS Database Space Utilization Program)

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

Hardware _____

UCC
UNIVERSITY COMPUTING COMPANY

First Class
Permit No. 13443
Dallas, Texas

BUSINESS REPLY MAIL

No postage necessary if mailed in United States

Postage will be paid by:

UCC
UNIVERSITY COMPUTING COMPANY
Customer Relations
P.O. Box 47911
Dallas, TX 75247.

Computerworld CW-678

We did it for tape, now we've done it for disk!

At Last... complete control of your DASD environment.

Only one software package can give you this kind of control. It's from the same people who gave you the UCC-1 Tape Management System... and it's the latest release of the UCC-3/ADAM Disk Management System

First, it produces complete reports that allow you to analyze your disk space situation. Other packages can provide some reports, however, UCC-3 is the only system offering VSAM data set reporting capabilities as part of the basic package.

Second, UCC-3 will clean up your DASD environment by scratching data that is no longer needed nor valid, and by migrating any selected

data sets to tape — where they may be readily retrieved. All this is done automatically... according to your criteria. But, UCC-3 doesn't stop here — like other systems do.

Because, having eliminated your disk management problems, UCC-3 will keep them from recurring. UCC-3 will help you control data set allocation and enforce standards. Only one software package has this capability.

The UCC-3 Disk Management System.

What have we done for you, then?

For one thing, UCC-3 will probably free up vast amounts of usable disk space... without your having to spend a cent on expensive new hardware. For another, now you can get control of your DASD environment... at last. And, you can stay in control.

One step remains. It's up to you. Just call us toll-free at 1 (800) 527-3250*... or mail in the attached postcard.

While you're at it, ask us about our other software packages, too:

A Tape Management System that has automated tape handling in over 800 shops. (UCC-1).

A DOS Under OS System that lets you use DOS programs, without reprogramming, as you convert to OS (UCC-2).

A PDS Space Management System that eliminates PDS compression (UCC-6).

A Data Dictionary/Manager that really gets IMS under control (UCC-10).

A Job Recovery Management System that makes restarts and reruns simple. (UCC-15).

A General Ledger/Financial Control System that Accounting has been dreaming of (UCC-FCS).

An IMS Database Verifier checks physical pointers, finds errors before they become problems (UCC-40).

An IMS Database Space Utilization Program pinpoints DB loading problems (UCC-41).

UCC

P. O. Box 47911 — Dallas, Texas 75247
Canada: 797 Don Mills Road — Don Mills, Ontario M3C 1V2
Europe: 1258 London Road — London, U.K. SW16 4EG

*In Texas, call (214) 688-7312

TERMINAL RENTALS

MODEL
43
\$**67**⁵⁰
MONTH*
\$4680 Month
on 36 month Lease/Purchase Plan



33 ASR-FF
\$**54**⁰⁰
MONTH
TWX-DDD
\$79⁵⁰*
MO
TELEX
\$76⁵⁰*
MO.



ADM-3A
\$**49**⁵⁰*
MONTH
ADM-1A — \$73.00 mo.



COUPLERS/MODEMS
TC 3002
O/A Acoustic 12⁰⁰ mo.
TC 5001
202T 18⁰⁰ mo.
TC 4001
113B
Auto-Ans. 18⁰⁰ mo.



300 LPM
IMPACT PRINTER
EIA or Parallel interface
\$**281**⁰⁰
MONTH*
\$19700 Month
on 36 month Lease/
Purchase Plan



**All equipment includes
national service**

*Based on 12 month contract, service included.

Get complete details with a direct call:

800/527-7700
or 214/252-7502 • Service 800/527-5608
TWX 910/806-5761 • TELEX 73-0022

vardon
& associates, inc.
930 N. Bellline Road • Irving, Texas 75061
A Subsidiary of Pioneer Texas Corp.

**SERVICE
PROBLEMS?**

NATIONWIDE SERVICE
356 CITIES
CALL

TECHNICAL ASSISTANCE BROKERS

800/527-5608

IN TEXAS CALL
800/492-9602 or 214/258-2620

© VARDON & ASSOCIATES, INC. 1978

Blindly Following Piper? — Part 2 User Programs Often Redundant

By Charles A. Gravitt
Special to CW

At the conclusion of last week's article, I noted that one effect of personal computing — encouraging end users to do their own programming as an adjunct to their regular tasks — might be that corporations lose the ability to support the programs upon which they have come to rely.

But there are other problems, too. For example, proliferation of the number of personal computing locations exposes a corporation to financing duplicate programming efforts.

To think otherwise presupposes that each personal computing location has unique needs that no one else in the corporation can use. Actually, few departments have unique needs — perhaps only Engineering and a couple of others.

Isolated Attention

Isolated needs get more attention than overall corporate needs. Data sharing between departments is less likely to occur. If the truth be known, one user department probably would not know what others were doing.

This has to lead to some redundant programming within the corporation, which should be taken into account to see if it is justified.

Everyone is cognizant of the fact that hardware vendors are in the business to sell hardware, and their success is measured by sales volume. Personal computing creates fertile ground for sales.

In addition to central site hardware, terminals and various support devices are needed. More demands for personal computing facility create opportunities for more sales.

Unpleasant Decisions

Multiplication of the personal computing sites is the main thing that could cause the unforeseen capital outlays — or some tough, unpleasant decisions when saturation of the central site is imminent.

It's a sort of progression that might happen. Sloppy, inefficient or unjustified programming by the personal computing users could place such de-

mands on the host mainframe to cause the need for more expensive central site hardware. The user departments will have placed such reliance on it for their operation that the corporation will be hard-pressed to decline an upgrade.

More personal computing sites cause more upgrades — a cycle in which the process feeds on itself.

Early Danger Signal

Part of the rationale for personal computing is that a using organization will need less professional programming staff.

This virtue will be quickly tarnished when the first request is made by a user department for the transfer to that department of one of the professional programmers to do the personal computing.

Why will this happen? It is one way to answer the need for efficiency in the programming a user department will be expected to do once its request for personal computing facility is granted.

The professional programmer, through long experience, has learned how to produce a product using the proper methods, even under heavy pressure. Having him would increase the likelihood that the user department will be able to deliver as promised.

If these transfers occur and the central site staff is dispersed, it is difficult to see where the savings to the corporation can be realized.

Distributed programming could undermine the checks and balances painstakingly developed over a number of years to control DP costs. From the corporate perspective, the overall knowledge of how the DP resources are being used, their effectiveness and their auditability are more difficult to grasp when widely dispersed.

Heavy controls will be required to ensure that unauthorized or marginally justified projects are not done. This could easily happen because the resources are under the control of those who want the computing work done, and some economic objectivity may be lost.

Unless personnel using the personal computing facility in user departments are selected with care and managed and monitored continuously, inefficiency will breed inefficiency and cause processing demands on the central site which inexorably lead to more hardware requiring substantial funding.

A corporation must weigh all considerations and ramifications before being stampeded down the glamorous personal computing path — or it may preside over the demise of cost-effective and productive DP services to its organization.

Gravitt is an attorney who served on the DP study team of then-Gov. Jimmy Carter's Georgia State Reorganization Project. He has had 16 years of DP management experience.

Here's a TI 765 with an advantage.



The midwest's leading
TI distributor has the
new 765 portable
available now for only
\$2695⁰⁰

LOONAM
associates, inc.
Tested &
Approved

What's the Loonam advantage?

1. LOONAM DELIVERS NOW. We are big in the computer terminal business. Our over half a million dollar inventory assures prompt delivery of TI and other computer terminals.

2. IT'S LOONAM TESTED. We test terminals before shipping.

3. A LOONAM 90-DAY WARRANTY. That's 90 days on every new terminal from the time it leaves our warehouse, not 90 days from the manufacturer.

4. THE LOONAM SUPPLY LINE. It's complete! We stock supplies for each and every terminal we sell.

5. IT HAS LOONAM SERVICE. Our customers think Loonam people are the most courteous and competent in the business. Our customer service is famous for quick, efficient handling of your requirements.

LOONAM
associates, inc.

5420 Edina Industrial Blvd.
Minneapolis, MN 55435

Call Loonam hotline: 800-328-4028, in Minnesota call 612-831-1616

Branch offices in Milwaukee, Omaha and St Louis

Links Noncompatibles

Net Process Boosts Interface Options

By Ronald A. Frank
CW Staff

CUPERTINO, Calif. — Tymshare, Inc. has introduced a networking process that enables users to configure private packet networks by interfacing otherwise noncompatible equipment and protocols.

Called Advanced Communications Technology (ACT), the process includes hardware and software components that will also be introduced into the firm's Tymnet packet network carrier subsidiary, a spokesman said.

ACT includes a minicomputer called the Tymnet Engine together with software designated Internally Switched Interface System (Isis). The Engine is a 32-bit machine with direct memory access, six levels of interrupt, 750-nsec cycle time, up to 32 high-speed synchronous channels and up to 256 medium-speed asynchronous channels.

Isis provides "dynamic internal switching" for dissimilar communications protocols, 64

job slots or communications interfaces and symbolic debugging facilities.

On one Engine, Isis reportedly can support asynchronous devices; synchronous network interfaces; packet assembler/disassembler (PAD) functions; gateway facilities to other networks under interfaces such as CCITT X.75, X.25 or Snap; and High-Level Data Link Control, Synchronous Data Link Control and the Advanced Data Communications Control Procedure (ADCCP).

Phased Introduction

Initially, the Engine and Isis will be supplied by Tymshare for configuring private packet nets, but the next step will be to introduce the ACT components into the operational capabilities of the Tymnet network to make the packet system operate with additional features. The final step will be to tariff the Engine and Isis for use at Tymnet subscriber facilities, a Tymshare spokesman explained.

The Engine is being built in-house by Tymshare, but components are off-the-shelf with little customized circuitry.

The key to the ACT system is Isis software, which was also written by the firm's staff. The software reportedly can support up to 64 separate partitions in one node, each of which can operate as an entirely separate communications environment, translating the protocol of an external device to a common internal protocol that passes through the Isis "dispatcher" to another partition. The second partition then translates the common protocol into that of the external device it is handling. Any number of partitions can communicate with the other partitions, the firm stated.

The ACT system is said to be particularly suited to users that have a diversity of terminals and protocols in operation and are considering a private network. Isis handler routines at each node take care of compatibility between otherwise noncompatible devices, the spokesman explained.

The key to interfacing devices or protocols to an ACT system lies in the Isis interfaces. Initially available interfaces include X.25, Tymnet, Tymnet/Tymcom (for non-Tymshare CPUs), Burroughs polling, Pars and other airline reservations systems, Data-pac Snap. Under development are Isis interfaces for IBM SNA 3270, ADCCP, etc. Digital Equipment Corp.'s Decnet (DDCCP), Univac and Control Data Corp. protocols are also planned.

For private packet nets, the Engine is

Bank Chalks Up 11% Increase In Productivity Using SNA

BALTIMORE — Equitable Trust Co. here effected an 11% increase in teller productivity and shortened average branch settlement to about 30 minutes from an average that had approached an hour or more by installing IBM's Systems Network Architecture (SNA) in place of a 60-year-old manual system.

By the early 1970s, the bank had expanded its teller-oriented services as fast as it had increased its number of branches, according to senior vice-president Robert D. Lockard.

Until 1974, teller operations utilized savings machines and an adding machine for every two tellers as the only mechanical aids. At that time, the bank was providing about 100 types of consumer services, including loan and credit card payments, utility bill payments and check cashing, Lockard said, and the number was increasing.

Bank management realized tellers needed a way to solve the problem of decreased productivity and also a method to shorten settlement time, which had increased beyond practical operation standards, Lockard said.

In the search for a new system, user orientation was the key to the final selection. The

choice was IBM's SNA hardware and programming umbrella and consisted principally of 17 branch-located 3601 controllers, 125 Model 3604 display terminals and 125 Model 3610 printers.

By mid-1979 the bank expects to have 45

(Continued on Page 44)

Bell Switched Service Still Pending

NEW YORK — With AT&T apparently on the verge of introducing an all-encompassing data network, have Bell's plans for its Dataphone Switched Digital Service (DSDS) been scrapped?

Not at all, according to an AT&T spokesman. The Federal Communications Commission granted 214 approval for the switched digital service last year which gave the phone company the go-ahead to construct facilities.

DSDS actually will utilize many of the same facilities being put in place for the Dataphone Digital Service (DDS), so separate construction facilities are not re-

quired.

What still remains to be done in order for AT&T to offer DSDS? A tariff has to be filed with the commission. AT&T cannot now say when the DSDS tariff will be filed. However, this does not imply that the service is in any way being downgraded, the spokesman said.

Asked if it is possible that a new service offering might supercede DSDS, the AT&T source said only that the switched service would be available. However, when the tariff for it will be filed or when the service will be available to users has not been determined, he added.

COMMUNICATIONS

~multiplexers

CLIP AND RETURN FOR FAST RESPONSE

ComDATA

☐ Series 200 frequency division multiplexer

Data rates: Mixture of asynchronous channels up to 300 baud
Channels: Maximum of 18 channels
Diagnostics: Remote and local loopback, test, busy-out, indicators
Multi-drop: Drop one or more channels at a number of locations
Multiple access: Multi-drop channels have equal opportunity for processor channel
Line: Dial or dedicated
Options: Voice-plus-data, data regeneration



\$465 basic unit
\$325 channel end

codex

☐ Series 900 time division multiplexer

Data rates: Mixture of synchronous or asynchronous up to the high speed modem aggregate
Channels: Up to 64 channels
Diagnostics: Remote and local loopback, busy-out
Line conditioning: C2 conditioning recommended
Options: Auto speed detection, multi-drop



\$1283 base unit
\$152 async channel end

☐ Acoustic Couplers ☐ Modems ☐ Terminals ☐ Accessories
Check items of interest and return to us for additional information

ComDATA

8115 Monticello
Skokie, IL 60076
312/677-3900

New York
212/267-3696

member of
IDCMA
Los Angeles
213/624-0550

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext. _____

Portable Unit Prints 136 Columns

PARAMUS, N.J. — A microprocessor-based, portable terminal featuring 136-column printout has been introduced by Computer Transceiver Systems, Inc. (CTS).

Described as compatible with major mainframes, minicomputers and peripherals, the Execuport 4000 handles Ascii, APL and IBM correspondence codes and prints at 30 char./sec.

Weighing about 16 pounds, the portable terminal prints upper and lower case characters including descenders — such as "g," "j," "p" and "q" — with no reduction in character size, CTS stated. Underlining, overscoring, subscripting and superscripting are also provided, the firm added.

The Execuport 4000 has a plotting capability with resolution of 24 vertical and 10 horizontal point/in. for graphic display of data and produces black or blue/black characters on either 8-3/4- or 14-7/8-in. white paper, a spokesman noted.

The Execuport specifies and locates a parity error by print-

ing the erring character a quarter step above the line of output. This provides a hard-copy record of errors for program checking and analysis and requires only a small portion of data to be retransmitted after correction, CTS said.

Among other error detection and alarm features, the terminal has a "ready light" on its keyboard to indicate when a signal of sufficient strength is being received from remote equipment.

As a diagnostic aid, a sequential printout of the complete Ascii character set can be executed by depressing a special key, CTS said.

The user can specify special codes or character sets, such as chemical or mathematical symbols or foreign language character sets.

The Execuport 4000 terminal costs \$3,495; first deliveries are scheduled in August from CTS at E. 66 Midland Ave., Paramus, N.J. 07652.

DEC Users Gain Modem

PORTLAND, Ore. — Nortek, Inc. has designed an auto-answer, auto-dial, low-speed modem for the Digital Equipment Corp. LSI-11 and LSI-11/2 microcomputers and the PDP-11/03 minicomputer.

The modem reportedly provides computer-controlled answering and origination of data communication functions when used in conjunction with a Bell CBS-type Data Access Arrangement (DAA). The number of data bits, parity and transmission rates of 110-, 134.5-, 300- and 600 bit/sec are software-selectable, enabling use with most available terminals, Nortek said.

The unit is priced at \$650. First deliveries are scheduled for July from Nortek at 2432 N.W. Johnson St., Portland, Ore. 97210.

Process Adds Net Options

(Continued from Page 39)

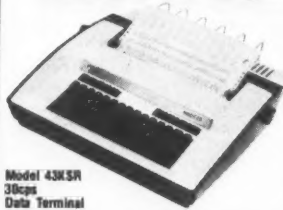
priced at \$60,000 to \$100,000. The Isis operating system, which would allow an Engine to be used only as a switching node, costs \$200/mo. The X.25 interface under Isis costs \$400/mo with other interfaces priced from \$250/mo to \$450/mo.

Lease plans are available for the Engine with prices depending on length of lease. Isis software is available only on a monthly fee basis, and the price includes system support and all updates. When the ACT hardware and software are added on Tymnet, it will be available at tariffed rates to be filed with the Federal Communications Commission.

Tymshare, Inc. is at 20705 Valley Green Drive, Cupertino, Calif., 95014.

SERIES 700
Distributed Processing Systems

TELETYPE[®]



Model 43KSR
30cps
Data Terminal

New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43

FEDERAL Communications Corporation

11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0644 TELEX 732211

Atlantic Research Adds Remote Control Switch

ALEXANDRIA, Va. — Atlantic Research Corp. has added the RCS-100 remote control switch to its line.

The RCS-100 is a communications line-switching system designed to perform fallback switching and line routing, according to the firm. It can be controlled both manually or electronically from either local or remote locations.

The remote control switch is suited for use in any switching

system that requires remote control via computer or standard telephone lines, while maintaining security through system access codes, a spokesman said.

The RCS-100 operates through a self-contained microprocessor that can be controlled by control entry through panel switches, control entry through the RP-1 remote control panel, serial data control entry from a data

terminal or CPU or Touch-Tone control entry from a standard telephone equipped with Touch-Tone dialing.

Software for the microprocessor can provide switching functions for any control entry, plus alarm and status functions. System security can be maintained through the use of access and security codes controlled only by the user.

Interchangeable plug-in modules can accommodate

four-, six-, nine- or 25-wire RS-232C circuits. The RCS-100 was designed to handle up to 16 lines.

A 16-channel configuration sells for \$4,400 from Atlantic Research at 5390 Cherokee Ave., Alexandria, Va. 22314.

Datatrol Banking System Costs Half of Competitors'

HUDSON, Mass. — Datatrol, Inc. has introduced a teller terminal system it claimed will perform tradi-

tional banking functions at half the average cost-per-terminal of competitive systems.

The FT-3244 system, with an average cost-per-terminal of \$2,500, does not require a branch-level controller because each terminal has a microprocessor that enables direct communications with the host computer via telephone lines, the company said.

The terminals operate on-line, partially on-line or off-line. The complete system consists of three components — the teller's console, which permits control over each event in a transaction procedure; the printer, used to prepare receipts, validate transactions and list console events; and the personal identification number (PIN) pad, used by customers to enter their own passwords for transactions requiring identification.

Up to six terminals can communicate through one drop on a multidrop network, Datatrol said.

The system is available from Datatrol at Kane Industrial Drive, Hudson, Mass. 01749.

Uniservo 10 Gets Low-Profile Units

BLUE BELL, Pa. — A low-profile version of the Uniservo 10 magnetic tape unit has been introduced by Univac for its Universal Terminal System 700 (UTS 700).

The Uniservo 10 tape unit configuration comes in a single-density phase-encoded (PE) unit and in a dual-density PE and NRZI unit.

The low-profile Uniservo 10 system operates at 25 in./sec with a transfer rate of 40k byte/sec PE and 20k byte/sec NRZI.

The price of the PE version is \$12,145; on a five-year lease including maintenance, it costs \$251/mo.

The PE/NRZI unit's purchase price is \$13,425; monthly rental is \$277.

TI's new 774 Intelligent Terminal System gets to the source of your processing needs.

One of the facts of business growth is that the wider the reach of your operations, the greater your need for capable distributed processing.

Now you can use TI's powerful Model 774 Intelligent Terminal System to preprocess your data at the source — reducing the burden on your host computer, minimizing your computing costs and improving productivity.

The Model 774 handles source data entry, local file inquiry and printing right on the spot, at one or more locations, and manages them efficiently and economically. It gives you the power of an onsite computer system and the operating ease of a conventional terminal.

With the 774, your video terminals can share a common data base and provide an efficient workstation for your branch office employees. The typewriter-style keyboard provides operator ease and efficiency. And, floppy-disk drives provide economical, easily accessed storage of data and applications programs.

The 774 is the latest addition to Series 700 Distributed Processing Systems. It follows the Model 770, the industry's first intelligent terminal with a built-in thermal printer. All members of the Series 700 family speak the same lan-

- ☐ 774 protects your investment:
 - Compatible Series 700 hardware/software family simplifies system expansion.
 - All family members speak TPL 700, a high-level language specifically designed for data entry.
 - Similarity of system operation minimizes retraining as system grows.
- ☐ 774 rapidly transmits clean data for lower communications costs.
- ☐ Multiple video stations share local data base.

guage — TPL 700, so the 774 is easy to program and operate with minimal operator training.

Because the 774 Intelligent Terminal System is upward-compatible, you won't have to worry about reprogramming or

retraining your operators when you upgrade your system to handle tomorrow's needs. You can expand to as many as eight video display units, four floppy-disk drives, two hard-disk drives, four character printers, or two line printers and two communications ports.

Finally, you can be assured of responsive customer service because the 774 is backed by TI's nationwide network of factory-trained personnel, and by TI-CARE*, our automated service dispatching and field service management information system.

For more information about TI's newest intelligent terminal system, mail in this coupon, or call your nearest TI sales office, or Computer Systems Division Marketing (512) 258-7305.

TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the 774 Intelligent Terminal System.
Please send more information.

Name _____
Title _____
Company _____
Phone _____
Address _____
City _____ State _____ Zip _____

Mail to: Texas Instruments Incorporated
P.O. Box 1444, M/S 784, Houston, Texas 77001

19-6-CW

*Service Mark of Texas Instruments

Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

We put computing within everyone's reach.

145

Most models
most features
Sale or Lease

COMDISCO
312-698-3000

THREE NEW DIGITAL DISKS MEAN 30 NEW DIGITAL SYSTEMS.

Last month we introduced three new, improved Digital disk subsystems — the 28MB RKO7, 5MB RLO1, and the 67MB RMO2. New capacity, state-of-the-art data integrity features, and prices lower than any in Digital's history. What's next? Thirty new, improved Digital computer packages.



Each system has been configured to take full advantage of the increased disk capacity and each one offers total system performance at prices never offered before.

Here are just three good examples. Remember, there are 27 more where these came from.

EXAMPLE #1: A BIGGER VAX SYSTEM AT THE SAME PRICE.

The 32-bit VAX-11/780 teams up with our new RKO7 disk subsystem to give you twice the disk capacity. Fifty-six million bytes of on-line disk storage. Plus twice the memory: 256K bytes of error correcting

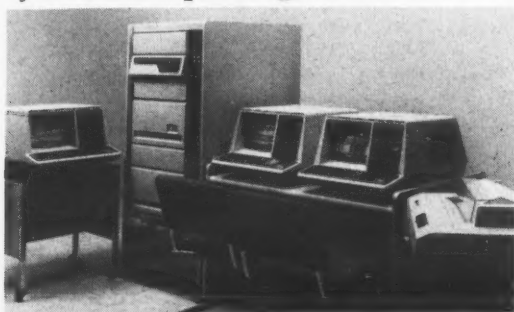


MOS memory. And with it comes Digital's fully supported VAX/VMS software, fast floating point arithmetic, and all the other great VAX performance features.

One thing hasn't changed though. The low VAX price.

EXAMPLE #2: A NEW DATASYSTEM.

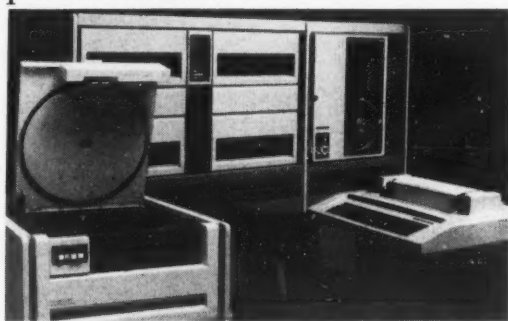
Now you can get a Datasystem 325 package with the



new 10 megabyte RLO1 disk subsystem. Bigger and faster — and what's more, it's less expensive. That's right. Datasystem 325 featuring Digital's LSI-11 central processor, 64K bytes of main memory, and the VT52-N terminal is now the biggest bargain ever.

EXAMPLE #3: A NEW REAL-TIME SYSTEM.

The powerful PDP-11/60 combines with the new 134 megabyte dual RM02 disk subsystem and becomes a real-time powerhouse.



The PDP-11/60 package includes Digital's fully supported RSX-11M software, the powerful PDP-11/60 central processor, 128K bytes of error correcting MOS memory, and more. Add the new disks and you get an enormous amount of performance for the price.

THERE'S MORE.

Now that you know about just three of the ways Digital's new disks are setting good examples, find out about the other 27. Send the coupon today. Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754. European headquarters: 12, av. des Morgins, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754. Attention: Communication Services (NR-2/2)

- ☐ Please send complete details on your new disk based systems.
- ☐ Please send your new disk brochure.
- ☐ Please have a sales representative call.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

CW6268

Multiple-CRT Configuration

NCR Adds POS System for Fast-Food Shops

DAYTON, Ohio — NCR Corp. has announced a modular electronic point-of-sale (POS) system designed to provide faster service and increased control in fast-food operations.

The NCR 2160 food-service system includes low-profile, multiple CRT terminals and 2 line/sec, 40 char./line matrix printers. The terminals and printers are linked to a 15-sq-in. microprocessor-based controller, a spokesman said.

Transactions are recorded via the terminal keyboard and automatically pro-

cessed by the controller. As a by-product of recording each sale, information is stored from which the system can produce a variety of management reports.

For increased efficiency, the "micro-motion" keyboard has a flat, smooth surface on which "keys" are outlined. Cashiers touch the appropriate positions on the surface to record the customer's order. The keyboard's surface is waterproof so that damage from spillage is minimized and the terminal is easier to clean, the firm said.

In addition, automatic calculation of taxes, price extensions and changes are combined with automatic price look-up, according to the firm. The cashier touches a key for an item and the system provides the price from memory. An optional printed receipt is available.

Regardless of the order in which items are entered into the terminal, the system rearranges the list so that all like items are grouped together when displayed on the visual display screen and printed, facilitating filling the order, according to the firm. Remote printers can be placed in the kitchen or other food-preparation area to list orders so that they can be prepared more quickly.

In addition to offering features that

will help improve customer service, the system can be programmed to provide management control, the firm said. For example, it keeps track of sales information by terminal, salesperson, department and store, available in printed form on demand.

The 2160 system is capable of calculating perpetual inventories and product yields down to the recipe level, the spokesman said. Additional report modules available include time-and-attendance, labor-cost and other payroll information.

A typical 2160 system including four terminals, controller and a remote printer for kitchen use is priced at \$15,690.

The systems will be available for customer deliveries in the third quarter.

Got a backup computer facility?

There's always the chance something or someone can "get to" your computer and put it out of business. Fire, flood, explosion, act of nature, disgruntled employee.

How long could your company stay in business without its computer resources? A month? A week? A day? At all?

You may qualify for limited membership in a national network of Recovery Operation Centers, all equipped with supporting utilities and data communication systems to suit its members' needs.

Let us hear from you. We're the leading management consultant in computer security, the proven name, advancing the state of the art through our work with 400 major corporations.



Data Processing Security
INCORPORATED

Dallas/Fort Worth: 235 N.E. Loop 820 Hurst, Texas 76053

Telephone: 817/589-2244

Regional Offices: Atlanta Chicago Los Angeles New York

Bank Reports 11% Growth In Teller Output Using SNA

(Continued from Page 39)

controllers, 550 terminals and 550 printers, a spokesman said. Data speed on the equipment is 2,400 bit/sec.

The system currently runs on dual IBM 370/158s with 3M bytes of memory. By January, the system will consist of IBM 3032 and one 370/158 with an attached processor and will have 4M bytes of memory.

The system has a 3705 front-end processor. Equitable Trust uses IBM's Information Management System (IMS) application software and Vtam with SDLC protocol, according to a spokesman.

In June 1977, the system started off-line at two pilot branches and in November switched on-line. The bank now has more than 30 branches on the system. Lockard said the bank looked for a minimum 11% increase in teller productivity and sought to shorten average branch settlement to about 30 minutes from an average that had approached an hour or more.

"To date, everything indicates an achievement of our goals," Lockard said. "The pilot environment measurements adequately proved the projections that showed that once a teller became experienced with the new equipment, processing those transactions could be equal to or faster than the original projections."

"Indications are that we are going to achieve a substantial increase in productivity and that we'll have an average branch settlement time of 30 minutes across the system. Teller settlement time will probably average about 15 minutes," he said.

According to the spokesman, the installation process was plagued with problems, about which he could not be specific. "They were not typical problems at all. We were supposed to be the only ones in the country having this type of problem. They've been corrected now — that's all that matters," he said.

'Source/Use' Procedure

All transactions are divided into a "source" or "use" of funds. When the customer gives the teller the transaction — the "source" — the teller determines what to do with that money —

the "use." Cash is always keyed in first and then checks. Next, the teller keys in where the money is to be distributed — to a checking or savings account deposit, for example, or to pay a gas or electric bill or an internal bill such as consumer credit. The teller no longer has to compute how much cash the customer receives, since the system does it automatically, Lockard said.

Every 10th transaction, the teller is instructed by the terminal to "press print." The teller must do this before the system can continue — and the terminal prints out the drawer cash total. Then the teller uses a cash sheet to make an actual count of cash on hand.

Should a teller leave the workstation, "interim sign-off" is performed. If anyone tries to put a transaction through in the teller's absence, the terminal will not accept it. When the teller returns and signs back in, the terminal asks for the teller's "secret number." Only when this has been given will the terminal disclose the last transaction and print the amount of drawer cash.

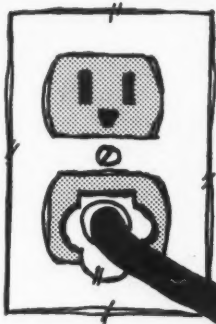
Audit Trail Available

Previously, tellers waited until the end of the day to know if their transactions balanced. Now, the entire audit trail is available. Totals are automatically accumulated, and at the end of the day the teller pushes a button to recall the data, Lockard said.

The printer will print out a tape of cash and checks as well as totals of all transaction types (with one copy retained in the terminal for the bank). After the tellers have settled, the system combines all the tellers' figures into group totals and produces a branch settlement sheet, eliminating the complex manual adding operation still used in most bank branches, according to Lockard.

The system was designed for minimum impact on customers. "The customer isn't really going to see too much of a change from the way we did business in the past. There may be a slightly different type of a receipt and passbooks may change some, but the bulk of our transactions are generally going to be the same as they were before," Lockard said.

THE \$99 MODEM*



If you don't need dial-up and you're looking for an inexpensive local or in-house communication link that's RS-232 compatible, then consider a pair of our M-1 asynchronous short haul modems. Purdue University, Princeton University, NASA, the U.S. Navy and many others have found that our M-1's are a cost effective way to solve communication problems up to 10 miles or 9600 bps.

Rack mount configuration is available too. If you need synchronous transmission ask about our M-2 synchronous short haul modem.

bo-scherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

Write or call us now for a data sheet and complete price information.

*100 Quantity

STRUCTURED METHODS, INC.

133 EAST 58TH STREET · NEW YORK 10022 · 212 355-2520

☐ Please enter _____ registration(s) for: _____
_____, and bill me/bill my company.
(Course, City and Date)

☐ Please send me information about the following courses: _____

Name(s): _____

Title(s): _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Computerworld

FIRST CLASS
PERMIT NO. 2131
NEW YORK, N.Y.

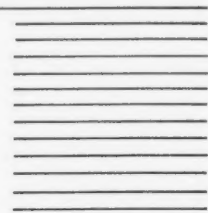
BUSINESS REPLY MAIL

No Postage Stamp Necessary if Mailed in the United States

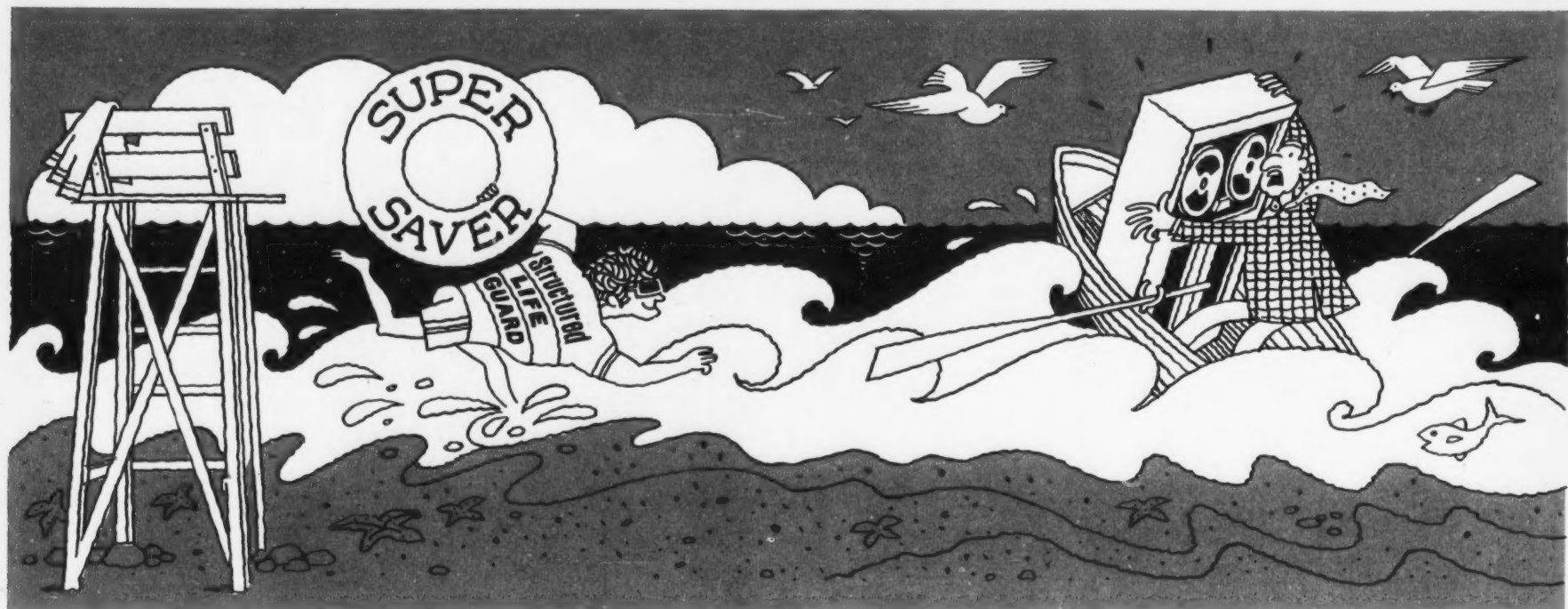
POSTAGE WILL BE PAID BY

STRUCTURED METHODS, INC.

133 EAST 58TH STREET
NEW YORK, N.Y. 10022



Structured Methods to the Rescue with Super Summer Savings!



Awash in the Software Sea

If you're in software development you've got to steer clear of the hazards that can run your projects aground. Many system implementors are in over their heads with unreliable products and are being threatened by the maintenance iceberg...but modern software engineering techniques like structured programming, structured design and structured analysis have proven to be lifesavers to hundreds of installations.

While we at Structured Methods can't promise blue skies and smooth sailing for every project, we can offer you education and consulting in software development techniques which can help you weather the stormiest seas of development.

Super Summer Saver

This summer Structured Methods is making it easier for you to arrange for inhouse training. Because vacations make scheduling training difficult during the summer months, we are offering you an opportunity to get into a pool for inhouse training.

Between July 4th and Labor Day our public seminar fees for groups of 4 or more have been reduced to equal the average fee per student at an inhouse course plus the cost of the training facility and meals. And, to help your scheduling even more, the total number of students for each subject is used to determine the discount — regardless of how many different locations are attended to reach that total.

	Per Student Cost:	
	2-3	4 & up
1 day course	\$157.50	\$125.00
2 day course	292.50	250.00
3 day course	427.50	375.00
5 day course	562.50	500.00
Discount	10%	20-28%

Seminar Schedule

COURSE	DAYS	FEE	JULY 1978	AUGUST 1978
Structured Caravan	1	\$50*		28 Little Rock 29 Dallas 30 Kansas City 31 Phoenix
Managing Systems Development — A Structured Approach	2	325	17-18 Denver 24-25 Chicago 31-1 New York	8-9 Calgary 10-11 Seattle 16-17 Wash., D.C. 21-22 Cleveland
Introduction to the Tools and Techniques of Structured Systems Development	1	175	19 Denver 26 Chicago	2 New York 18 Wash., D.C. 23 Cleveland
Structured Design	3	475	10-12 Pittsburgh 17-19 New York 24-26 Seattle 31-2 Chicago	7-9 Wash., D.C. 14-16 San Francisco 21-23 Minneapolis
Structured Analysis	2	325	13-14 Pittsburgh 20-21 New York 27-28 Seattle	3-4 Chicago 10-11 Wash., D.C. 17-18 San Francisco 24-25 Minneapolis
Structured Analysis/Design Workshop	5	625	10-14 Cleveland 17-21 Calgary 24-28 Denver 31-4 Toronto	7-11 Houston 14-18 New York 21-25 Seattle
Structured Design/Programming Workshop	5	625	10-14 Minneapolis 17-21 Houston 24-28 Cleveland 31-4 Denver	7-11 San Francisco 21-25 New York
Structured Programming for COBOL Programmers	2	325	27-28 New York	3-4 San Francisco 7-8 Chicago 24-25 Wash., D.C.
Structured Programming for PL/I Programmers	2	325	27-28 Toronto	14-15 Wash., D.C.
Infotech/Jackson WEEK 1 Design Technology Workshop	5	625	17-21 Chicago 31-4 Boston	7-11 New York 14-18 Boston 28-1 Chicago
WEEK 2	5	625	24-28 Houston	
Data Base Package Analysis & Selection	3	475		23-25 Wash., D.C.
IMS/VS Data Base Design	5	625	24-28 Wash., D.C.	7-11 Chicago
IMS/VS Programming	5	625	31-4 Wash., D.C.	14-18 Chicago
Data Base in a Distributed Processing Environment	2	325	10-11 Chicago 24-25 San Francisco	14-15 Minneapolis
Data Base Management Systems for Minis — A Comparative Analysis	3	475	12-14 Chicago 26-28 San Francisco	16-18 Minneapolis
Systems Design in a Data Base Environment	2	325	17-18 Chicago 31-1 Minneapolis	21-22 San Francisco
Designing Effective Data Bases	3	475	19-21 Chicago	2-4 Minneapolis 23-25 San Francisco

* Entitles attendee to a \$50 credit towards any Structured Methods service.

Registration for consecutive courses.

Introduction to the Tools and Techniques of Structured Systems Development & Managing Systems Development \$475
 Structured Analysis & Structured Design 625
 Data Base in a Distributed Processing Environment & Data Base Management Systems for Minis 625
 Systems Design in a Data Base Environment & Designing Effective Data Bases 625
 Transaction Oriented Processing & Transaction Processing Control Systems 625
 Infotech/Jackson Design Technology Workshop—Weeks 1 & 2 1200

Fees include all materials, lunch, continental breakfast and coffee breaks.

If our schedule doesn't have a location that's right for you, tell us about it. We might be able to schedule a special public in your city. And just because it's summer doesn't mean we're not teaching inhouses.

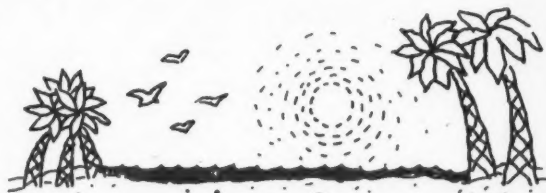
Structured Methods, 133 E. 58th St., N.Y., NY 10022

The Structured Caravan

The end of the Summer Savings will herald the return of the Structured Caravan, our one-day introduction to Structured Methods. Through a combination of technical talks and group clinics you'll get an up-to-the-minute picture of what's happening on the front line of the structured revolution. We'll be in —

Little Rock on August 28
 Kansas City on August 29
 Dallas on August 30
 Phoenix on August 31.

To add your name to the list of over 250 organizations who have sent representatives to 15 oases this year, send in the card or coupon, or call us collect at: 212-355-2520.



STRUCTURED METHODS, INC.
 133 EAST 58TH STREET · NEW YORK 10022 · 212 355-2520

☐ Please enter _____ registration(s) for _____

(Course, City and Date)

☐ Please send me information about the following courses:

Name(s): _____

Title(s): _____

Company: _____

Address: _____

City: _____ State: _____

Zip: _____ Phone: _____

☐ Payment Enclosed ☐ Bill Me ☐ Bill My Company

Charge my: ☐ Visa ☐ Master Charge

(Interbank No. — above your name) _____

Card No.: _____

Expiration Date: _____

Signature: _____

Touch-Sensitive CRT Debuts

BLOOMINGTON, Minn. — Information Dialogues, Inc. has introduced the Model 10 microprocessor-based touch-sensitive CRT terminal designed for use by nontechnical personnel in business, education and government.

The Model 10 allows users to enter and retrieve information by touching the unit's glass faceplate. The system responds to human contact by offering new display images that provide additional explanation and associated selections, a spokesman said.

The unit has a 15-in. screen that displays up to 80 char. on each of 24 lines, the firm

said. The screen has 32 "touch pads." The removable keyboard offers local/remote, character interactive/page edit and carriage return only/automatic line feed.

The unit offers a 96-char. Ascii set displayed on a 7 by 9 dot matrix format, the firm said. The Model 10 is RS-232C-interface-compatible with switch-selectable transmission rates of 110- to 19,200 bit/sec operating in full- or half-duplex mode.

Basic price for a unit, including keyboard, is \$4,100 with delivery in 60 days. The firm is located at Suite 429, 2850 Metro Office Park, Bloomington, Minn. 55420.

Teleprinter Line Suits Private, Public Nets

SYRACUSE, N.Y. — Leigh Systems, Inc. has introduced a line of automatic send/receive, keyboard send/receive and receive-only teleprinters intended for use in private data transmission networks, TWX and Telex services and as computer I/O devices.

The line consists of two series. The Series 800 teleprinters generate and accept signals

in an 8-level, 11-bit binary code conforming to Ascii standards, according to a company spokesman. They are compatible with most computers, he added.

Series 500 models utilize a 5-level Baudot code conforming to CCITT #2 standards. Transmission rates range to 110 bit/sec for the Series 800 and 75 bit/sec for the Series 500, according to the spokesman.

The teleprinters operate at speeds to 100 word/min. Because they incorporate Western Electric Co. patents, they

Terminal Transactions

are compatible with similar teleprinter terminals, according to the firm.

A variety of options is available.

In the Series 500, the ASR-32 sells for \$1,156, with immediate delivery. The Series 800 ASR with manual reader is priced at \$1,123 and with automatic reader is \$1,191.

The firm is located at 6081 Court Street Road, Syracuse, N.Y. 13206.

Interdatas Get Terminal Adapter

PLACENTIA, Calif. — RDV Engineering is now supplying Interdata, Inc. minicomputer users with an alternative for interfacing local RS-232C terminals. The Quad Asynchronous Local Terminal adapter (Qualta) provides four channels of serial data communications without Modem controls on a half board, the firm said.

The Qualta reportedly maintains both software and hardware compatibility with host products when used for local terminal communications and offers the following switch-selectable functions: consecutive 10-bit address field, duplex mode and 50- to 19,200 bit/sec transmission rates.

Low-power Schottky construction reduces power consumption of four channels 85% to .75, a company spokesman said.

Programmable word length, parity and stop bits allow a variety of CRT and printing terminals to be used, the firm said. Terminal status can be monitored with "data set ready" status, while all other modem status lines are unused and give no status.

Available immediately and covered by a one-year limited warranty, the Qualta costs \$418.50 in quantities of 100 or more from RDV Engineering, 319 Dolores Circle, Placentia, Calif. 92670.



The office of the future has just received its first electronic mail.

COMET—the computer message system that lets you compose, edit, send, receive, file, and retrieve virtually any type of intra-company correspondence.

COMET frees executives from the tyranny of the telephone. It cuts down on paper clutter. It helps make business communication simple, direct, and effective.

For details on the first electronic mail system designed to fit the way you work—and the way you'll be working tomorrow—attach your business card to this ad and send it to: Computer Corporation of America, Communication Technology Division, 575 Technology Square, Cambridge, MA 02139. 617-491-3670.

COMET™
Computer Corporation of America

[illegible]

June 26, 1978

Edited by Tim Scannell

Justified for 100,000 Page/Mo COM Offers Benefits to High-Volume Users

Special to CW

Computer output microfilm (COM) has four general advantages: It reduces computer printing time and its attendant costs, is faster than paper printouts for distribution and retrieval of information, is versatile and allows expansion of the information user base. These are all desirable objectives, but the advantages must be weighed against COM's disadvantages.

First of all, any system should be cost- or function-justified. If COM is used to reduce print runs on a computer, the volume of paper must be sufficiently high; as a rough rule of thumb, 100,000 printed pages per month must be potentially available

for conversion to COM before a COM operation can be cost-justified.

Second, COM produces microfilm, which cannot be read without a ma-

chine — reader or reader/printer — and cannot be written on. The user will therefore have to adapt to a totally new way of handling information, and that

places a burden on the system's installer and management who must educate and motivate.

Production costs computed for a COM operation should include the following items: supplies (film, chemicals, spools), quality control equipment, the COM unit itself, film processor (if not a part of the COM device), labor and computer time required to output the data.

This article is excerpted from Auerbach Publishers, Inc.'s Input/Output Reports, a three-volume monthly updated reference on all major facets of peripherals and data handling equipment.

A paper-printout system's production costs, on the other hand, must include computer time, a line printer, paper, a decollator and a binder. These are the most obvious cost items. A more detailed analysis would cover such things as power, light and water

consumption; software development costs; supplies, such as ribbons and/or ink for the line printer; and so on.

As a line printer replacement, COM produces and updates computer output files much faster and, assuming output of 60,000 or more pages per month, at a lower cost. Most line printers output at a speed of up to 1,200 line/min with no more than six copies per run. Faster line printers are in the offing, but they are not close to the speed of COM recorders that now produce between 18,000- and 26,000 line/min.

Mainframe Time Reduced

COM speed brings about economy that is most noticeable at the computer site — it cuts down on mainframe time. It should be noted, however, that some line printers operate off-line, so COM isn't the only alternative for reducing computer time.

However, even off-line printers use paper, and that is perhaps the biggest area in which costs can be cut with microfilm. In one recent year, the cost of paper increased by 40% to 50%, while the cost of film went up 10% to 15%.

It has been estimated, with all factors computed, that the cost of microfilming via COM is about one-fourth the cost of computer printing. Of course, the ratio varies depending on output volume.

Basically, there are two types of COM systems — on-line and off-line. A major advantage of the on-line sys-

tem is that it can be used in a central DP facility in San Diego.

In an average day, Home Federal generates 120 microfiche records from 37 master tapes, Kanoff stated, explaining that one master stores the equivalent of 208 pages of 11 by 14 by 3/8 in. computer output paper.

Moreover, in its quarterly fiscal report, Home Federal generated 87 master tapes on the last report and made 60 copies of each master. Microfiche stored the equivalent of more than one million output pages, he said. The 1978 year-end quarterly will entail around 120 masters, he predicted.

(Continued on Page S/4)

Smooths Data Flow

Fiche Generator Reduces S&L's Overhead

By Brad Schultz

CW Staff

SAN DIEGO — Home Federal Savings & Loan has cut DP overhead and streamlined data flow with its microfiche generation system, according to Home Federal's DP group operations manager, George Kanoff.

Home Federal stores data pertaining to teller and interbank transactions, general ledger accounting and other financial activities on magnetic tape and then creates microfiche records of this data for on-line access by its numerous branch offices, Kanoff said.

Home Federal finds that its Datagraphix, Inc. Autocom system is simple to operate, requires little previous instruction and has made data flow much more efficient among the institution's numerous branch offices, Kanoff stated.

Prior to acquiring Autocom, the institution had relied on service bureaus to produce the microfiche, he noted, explaining that on a daily basis, accumulated magnetic tape records were picked up by a service bureau and microfiche records of the taped data were produced at the bureau's facilities.

This arrangement proved unsatisfactory, Kanoff stated, indicating that transportation of tape to the service bureau and of fiche from the bureau back to Home Federal was unreliable and the procedure's weakest link.

As a result, Home Federal decided to develop its own microfiche generation facility driven by the institution's two IBM 360/65s, he said, adding these CPUs each feature 1M byte of core and support IBM's Edos Tape Management System and Cullinane Corp.'s Integrated Data Management System.

However, the savings and loan is just now replacing one 360/65 with an ITEL Corp. AS/5 Model 3, that firm's IBM 370/158 "workalike," Kanoff noted.

Choice of Output Modes

Datagraphix provided the Autocom system and a special software module enabling Home Federal to generate records from magnetic tape input in either hard copy or hard copy/microfiche modes, he continued.

By agreement, Datagraphix automatically provides Home Federal with microfiche and duplicating film. So far this year, the institution has received

36 rolls of microfiche film and 80 rolls of duplicating film, Kanoff noted, adding that one roll of the former is consumed every 10 days by his firm.

Home Federal selected Datagraphix Autocom after rejecting offers from Eastman Kodak Co., NCR Corp. and Qantel Corp., he said.

The company has also acquired a large stock of customized peripheral equipment; 550 Lear Siegler, Inc. terminals and a large number of Okidata Corp. printers, Kanoff said, noting that every Home Federal branch has a CRT, keyboard and printer for communication with the institution's cen-

COM Turns Brokerage Into Publisher

By Marcia Blumenthal

CW Staff

LOS ANGELES — If computer output microfilm (COM) technology did not exist, a computer-based publishing house here may have remained a brokerage firm sharing in the ups and downs of the stock market, which over the last few years has come to resemble the medical chart of a malaria patient.

Instead, William O'Neil and Co., the 130-employee DP-based publishing house — which has all of its output on microfilm — is thriving. Sales recently

hit \$8.5 million.

"We print about 100,000 original pages a month through the system," according to Vance A. Griffiths, vice-president of marketing. For the past five years the system, composed of a Burroughs Corp. B6700 mainframe and an Information International, Inc. FR 80 COM graphics recorder, has produced *Datagraphs*, a 700-page book of stock charts and information compiled every week.

"We have to have tremendous speed," Griffiths explained, "because we

produce 10,000 charts every Friday." A chart takes about one second for the FR 80 to produce, he noted.

Each chart provides a record of a stock's performance during the preceding week and, by using the company's data base, can be extended to show results for the past 10 years.

The graphics contain information on more than 80 fundamental and technical factors that influence the prices of stocks listed on both the New York and American exchanges.

(Continued on Page S/8)

On the Inside

COM Offers Benefits to High-Volume Users	S/2
Fiche Generator Reduces S&L's Overhead	S/2
COM Turns Brokerage Into Publishing Firm	S/2
CRT/Printer Units Now Economically Feasible	S/3
Color CRTs About to Come of Age	S/3
Printer Advances Promise Increased Diversity	S/5
Flatbed, Drum Plotters Differ in Advantages	S/6
System Speeds Design Turnaround	S/7
Develop Specific Plans for COM, Users Urged	S/12
Laser's Features Make It Viable Print Medium	S/13
Independent Peripherals: More Than Cost at Stake	S/14
Mini, Printer Help Launch Publishing Venture	S/15
Disk Replacements Please Programming Firm	S/16
Ultimate Solution for Hard Copy Not Yet Offered	S/19
Printer Allows Flexibility in Traveler Badges	S/20

CRT/Printer Units Now Economically Feasible

By James Folts
Special to CW

One of the most obvious needs of the DP community is an inexpensive and quiet terminal that combines the display advantages of a CRT with the hard-copy capability of a printer, all at a reasonable cost to the user.

While users find the low cost and high speed of modern CRTs very attractive, they cannot ignore the ever-present need for hard copy. The expense of adding a printer to a CRT has caused the majority of users to purchase keyboard printer terminals, leaving them no alternative but to tolerate the noisy printers and reams of unnecessary paper.

Recently, several inexpensive thermal printer mechanisms and printers have been introduced which can present viable solutions to the problem. Printing on paper of various widths from 4 in. to 11-1/2 in., these devices can be inexpensively built into, or sold along with, CRT terminals to provide the occasional hard copy needed by CRT terminal users.

Simultaneously, they allow the user to take advantage of the CRTs' quiet speed. While many users will not find

aluminum-coated or tape-width paper acceptable, the wider, 8-1/2 in. by 11-in., standard-size paper is ideal for copying the contents of CRT screens.

The problem with most of the "packaged" solutions previously introduced has been the cost of integrating CRTs and printers which were designed as independent computer peripherals.

Several manufacturers are designing printers as CRT peripherals rather than computer peripherals. Since these printers carry none of the firmware overhead inherent in freestanding, keyboard printer terminals such as the need to see the last character printed and the need to print a character at a time, a significant cost savings is realized.

Most printers of this design are able to transfer the entire contents of the CRT screen to memory, then print the page. Operators are able to resume their data entry or inquiry tasks at the CRT in as little as two seconds, eliminating the need to wait until the printer has finished copying the CRT screen's contents.

Users accustomed to dealing with printer terminals are quite concerned

about the time terminal operators are required to wait. They want minimal interference by the printer with subsequent CRT operations.

Examining the basic question of time, it becomes apparent that there are two aspects: first, transferring screen data to the printer buffer and, second, printing that data. The 2-sec transfer rate of CRT peripheral-printers is practically unnoticed by the terminal operator and answers the first question; the 20 seconds required to print the page solves the second question. Printers of this type are sufficiently fast since the operator cannot prepare another screen for printing in that short a period.

The interesting aspect of these CRT/printer packages is the range of price/performance they will make available to end users and OEMs alike. At the low end, where printers are to be combined with simple, interactive CRTs, terminal manufacturers or OEMs will be able to offer CRT/printer packages at prices less than many matrix printer/terminals without CRTs. At the same time they will be capable of outperforming the 100 char./sec teleprinters in performance, operator pro-

ductivity, convenience and silence. And of course, paper costs are lower because of the units' selective printing capability. No longer must a meaningless audit trail of interactive dialogues and terminal commands be preserved only to be thrown away.

At the mid-range, when CRT/printers are combined with editing CRTs, not only does the user have the extensive editing, block transmission and forms-drawing capabilities plus the ability to depict bar graphs, but screen forms and bar graphs may be transferred directly to hard copy. Even inverse video will faithfully be reproduced as inverse printing. The user can therefore save the costs of special forms by copying them from CRT screen to printer.

In the high-price range of CRT terminals, there are already CRT/printer combinations available. But even here the page printer concept enables OEMs and users to realize the same benefits: increased operator productivity, quiet and selective printing and lower costs.

The CRT/printer terminal concept is now an economical reality for price-sensitive applications. Advancing LSI technology has once again provided the means by which the computer industry can give the end user what he really needs — at a cost he is able to pay.

James Folts is vice-president of Perkin-Elmer Data Systems and general manager of Perkin-Elmer's Terminals Division.

Color CRTs About to Come of Age

By Charles A. Muench Jr.
Special to CW

NORCROSS, Ga. — If the '70s go down as the decade when the technology of the microcomputer was developed and refined, the '80s will surely stand out as the decade when color comes of age.

The inclusion of color is part of the logical progression of developing hardware and software that are more responsive to individual system demands. But, just as important, color represents a flexible and sophisticated new tool for individual operators.

Aside from the obvious appeal a color CRT has over one offering just black-on-white or white-on-black characters, there are also some scientifically based facts that support the benefits of color coding. One experiment, detailed in the *Journal of Applied Psychology*, involved 22 men and women with normal color vision. Each individual viewed, in sequence, a total of 180 displays in two experimental sessions.

The displays consisted of random alphanumeric characters, significantly "cluttered" to increase the complexity of the viewing screen. In half of the displays used, there was no color coding; the items were white on a dark background. In the other half, all the symbols in an item "were displayed in a particular color with the color code chosen to be redundant with the class designator letter," according to the journal.

Displays were shown in pairs — with and without color — and subjects were told to scan the display to find a particular item. A performance measure was then taken on the amount of time it took each individual to locate a specific item.

The results of the study showed that "color coding markedly reduced both search and counting times as well as counting errors," according to the report. There was also a sizable reduc-

tion in the number of counting errors when color was introduced to the subjects. "As compared with black and white displays, the color-coded displays resulted in an overall error reduction of 76% in the counting task," the report noted.

Color coding succeeded in increasing the discriminability among items of the various classes. "This improved separability has the effect of making the spacial distribution (patterning, clustering) of the randomly placed items more perceptible and serves to guide the eye during search and counting tasks," the report said.

Color and Shapes

In another study, which used military symbols, geometric forms and aircraft shapes as well as a variety of colors, the results confirmed the effectiveness of color for a counting task. The experiment, which appeared in a later edition of the *Journal of Applied Psychology*, indicated that "when color and shape are superimposed on a display, the color code will prove dominant in the visual separability it provides."

The experiment also showed, however, that as more colors are added to the display there is a decrease in the average discriminability "that would eventually reduce the effectiveness of the color code." In short, colors should be limited to a minimum of five and a maximum of 12, depending on viewing conditions.

Similar experiments documented a quicker man-machine interaction when color-coded alphanumeric characters were used as well as a reduction in the incidence of operator fatigue.

Taken alone, any one of these findings is important in its own right, but taken as a whole they become a combination of advantages that is hard to ignore as a vehicle for increasing operator efficiency. And with the advent of sophisticated low-cost color, the bene-

fits to individual operators take on even greater significance.

On the systems development side of
(Continued on Page S/8)

USER'S CHOICE

The Tally 1200 Baud Printer Terminal has more to offer.

Control 42 functions via the keyboard or user program. Get super print quality, 160 cps optimized bi-directional print speed, quietness, six selectable type fonts, u/l case, 1k buffer, 300 through 9600 Baud operation, tabletop or pedestal mount. There's much, much more to tell so write or call for our brochure. Tally Corp., 8301 S. 180th St., Kent, WA 98031 (206) 251-5524 or direct dealer inquiries to Business Systems Sales, 23 Altarinda Road, Orinda, CA 94563. (415) 254-8350.

DEALERS:
Arizona/New Mexico
Southwest Peripherals (602) 267-7536
Boston
Marketechs, Inc. (617) 237-4343
Orange County
MCI Computer Products (714) 751-2005
Los Angeles
Able Communications (213) 924-3378
Detroit
Alpha Computer Corp. (313) 261-5830
Oklahoma City
tel-tex (405) 840-2748
Houston
tel-tex (713) 526-8326
San Jose
Digicom (408) 279-8711
Dallas
tel-tex (214) 231-8077

TALLY®



High-Volume Users Can Benefit From COM

(Continued from Page S/2)

tem is that it costs less than most off-line units because it doesn't have a tape drive, nor does it usually have the multiple size film output (16mm, 35mm, 105mm) capability. Programming for this type of system must be handled through the CPU.

Off-line systems without minicomputers must also be programmed through the host computer, the instructions being recorded on magnetic tape along with the data. Some COM systems, however, provide a means for programming commands such as for calling up the correct forms flash through the unit itself.

All COM manufacturers supply at least a minimal amount of software. Basic programmed instructions accom-

plish the following: data is output to magnetic tape instead of to a high-speed printer, the format (page/image) is modified if necessary to fit the specific COM unit and the tape is coded so that it can trigger the proper forms flash.

As COM users have gained experience and are putting more applications on microfilm, the demand for more flexibility has been growing and is reflected in increased interest in minicomputer-driven systems. The mini can be configured with storage devices and can be programmed to do a variety of functions. The mini also

Fiche Generator Slices Overhead

(Continued from Page S/2)

Home Federal keeps its masters in a locked vault. Kanoff pointed out that, as a financial institution, Home Federal must keep a number of different record types accessible for a minimum period of time in accordance with Federal Reserve Board regulations.

Branch Independence

Each of the firm's 59 branches maintains its own microfiche reserve and is thus not dependent on the San Diego DP center for the latest information on personal accounts, he said, noting, however, that all branches are interconnected in a data network called Vision.

The technical support group handles all system maintenance throughout California, Kanoff added. Kanoff heads all of Home Federal's DP operations — its operations analysis group, which handles internal software development and the tape-to-microfiche conversion; the DP center; and the technical support group.

Kanoff's "high guess" for the Autocom operation's annual overhead, excluding the wages of operating personnel, is about \$8,000. Autocom precludes the need to consume \$24,000 worth of paper annually on the quarterly reporting alone, he said, noting this yields a net savings of \$16,000 in that one application.

But more significantly, Home Federal cannot print records fast enough to meet its needs given its current volume of transactions, he said, indicating that the institution is now compelled to use the medium of microfiche in creating records.

In addition, the Autocom system eliminates the need to employ a large clerical staff for handling the records, Kanoff added.

"We have computer operators that go over to the Autocom machine, mount up the tape and virtually walk off and leave it," he said.

"It starts spitting out masters like crazy. Then we have a clerk-type wearing white gloves [who] takes the masters, inspects them, puts them one at a time into the autocopier, dials in the number of copies she wants and makes those," he continued.

Kanoff said the biggest problem with the Autocom process at present is collating after copying, but he predicted that "in the not-too-distant future" the collating procedure will be further mechanized, eliminating a number of slow manual stages.

freed the main computer so all it has to do is output data to magnetic tape.

The final product or output of the COM system should be given appropriate consideration in deciding on a COM unit. The surest test for COM output is examination with the naked eye. Obvious differences the user will notice in output from different systems are the character font and character sizes. Some units have only one font and one size; others, one font but in three sizes; others, multiple fonts and multiple sizes. The number of characters per font also varies from system to system. Most have a minimum of 64 characters per font while others offer as many as 128.

In a graphics system, the drawing will be generated using either a dot matrix or stroking technique. Most systems use the matrix. As the number of dots in the matrix varies, it affects the quality of the output. More dots mean clearer reading.

Indexing Critical

Finally, indexing should be treated as a critical feature in active microfilm systems. Most COM manufacturers have recognized this need and developed indexing capabilities for their

COM units.

The most common type of index is simply a rectangular "blip" mark recorded under or next to each frame of film. Those blips are counted in some automated retrieval systems. Indexing data could also be routed onto magnetic tapes by the host computer in an on-line system or by a minicomputer in an off-line configuration. Indexing can, in fact, become quite refined and sophisticated, depending on how much computer time the user wants to use and how much software he wants to develop.

COM, for better or worse, is married to the computer system although user organizations still are unsure of who should manage it. That situation is likely to continue for some time.

One advantage to the COM industry is that COM, unlike computers, has usually had to pay its own way right from the beginning and most in-house systems are installed after the user has had some experience with a COM service center. So, the changes wrought when the COM unit moves in-house are, at least, less radical, disruptive and frustrating than those caused by the company's first computer.

FUJI FILM

NEW FUJI-COM IS HERE

Fuji Film's world-renowned technology has now developed two outstanding new Fuji microfilm emulsions for today's COM requirements.

Fuji-Com is a medium speed emulsion of high contrast with fine granularity designed for standard CRT recording.

Fuji-Com SE is an extremely fine grain emulsion with ultra-high resolution designed for high reduction CRT recording.

Both Fuji-Com films are packaged in 16, 35, and 105 mm widths in various lengths, on standard cores to be easily loaded in all standard COM devices.

For more information or, better yet, a demonstration, call or write U.S. Microfilm Sales Corporation, 235 Montgomery Street, San Francisco, CA 94104. Telephone: (415) 433-4864.

A full line of chemistry designed for both types of film is available to meet your requirements.

Distributed exclusively by:

U.S. MICROFILM SALES CORPORATION
BOSTON • ST. LOUIS • SAN FRANCISCO

**SPECIAL PRICING
CALL NOW**



T1743 Data Terminal



LA36 DECWRITER II



T1765 Portable Memory



300 LPM Printronix

computrend inc.
Sales • Service • Leasing

90 DAY SPECIAL

LA36DECwriter II - \$1495
LS120 DECwriter III - \$2595
T1743 Data Terminal - \$1295

IMMEDIATE DELIVERY

22 "A" St.
Burlington, MA
617-272-8372

New England's Leading Data Terminal Specialists

Name _____
Company _____
Street _____
City/State _____
Phone _____

☐ Printers ☐ Data Cassettes
☐ Line Printers ☐ Floppy disks
☐ Portable Terminals ☐ Teletypes
☐ CRTs ☐ Acoustic Couplers

Cut & Return for more information

RESPONSE TIME MONITOR

for multidrop terminal networks.



MONITORS RESPONSE TIME on asynchronous and bisynchronous multidrop terminal networks.
DISPLAYS minimum, maximum, last transaction, number of transactions and maintains running average on 4-digit LED display.
DATA RATES from 75 to 9600 baud.
TERMINAL CONNECTION via optical coupler or RS-232C bridge.
RESOLUTION is 0.1 sec. with 9,999 sec. possible.

All packed into one self-contained, self-powered monitor, the

MODEL 300

\$1500 F.O.B. Salt Lake City, Utah

Manufactured and serviced by:
QUESTRONICS, INC.
3565 South West Temple, #5
Salt Lake City, Utah 84115
(801) 262-9923

Industry Boosts 96 Vendors

Printer Advances Promise Increased Diversity

By Kenneth C. Freund

Special to CW

The rapid pace of computer printer technology has not only kept up with computer technology but may have surpassed it in terms of diversity.

There are 96 vendors with a total of 309 printers or printer families — using about a dozen techniques ranging from 10 char./sec cylinders and balls to sophisticated 14,000 line/min laser-xerography.

Industry trends seem to indicate multifaceted movements toward consolidation of large processor sites, expansion of distributed computing and installation of independent small systems — all of which impact the computer printer market.

Centralization within a user company will result in large, general-purpose systems becoming even larger. In some instances, high-throughput printing devices will be required at the CPU site. A classical current alternative, of course, is multiple-printer installations — for example, three 600 line/min printers instead of one 1,800 line/min unit.

As the ultra-high-speed printers gain acceptance they will surely find application in central computer sites. Their cost, however, will be a limiting factor and medium- to high-speed line printers will continue to dominate with about 70% being in this category. Units operating at less than 300 line/min will make up the remainder.

Remote Printing

Computing-resource consolidation is not necessarily associated with consolidation of the printing function. And this will be one of the significant growth areas by the end of 1981. On-line data entry, via CRT terminals, will be accompanied with remote hardcopy printing at the entry site.

There is also a strong trend toward distributed processing in which computing resources are spread throughout an organization and linked through a communications network. Each satellite computer has complete printed output capability.

Distributed data entry is accomplished through the use of intelligent or nonintelligent terminals, again located at outlying points. Such terminals may be either independent or clustered devices and require printers for hard-copy output, in a manner similar to that of centralized processing with on-line entry.

As both small business and terminal-based systems become less costly, their utilization is expected to proliferate. Both of these areas are expected to be extremely strong markets for printers in the future.

This migration away from the typical computer room, while not causing great technological changes, will bring about subtle changes as printers move into the office environment. A recent survey indicated that 80% of the printers in DP rooms had no noise barrier between equipment and operator — obviously an intolerable situation in most offices.

Look for the new generation of printers to be quieter, aesthetically pleasing and compact. Europeans already express sensitivity toward noise. It will only be a matter of time before

users insist on quieter machines.

Offices don't have static guards woven into their carpets (common in computer rooms) if they have carpets. One of the tough design problems now being addressed by printer manufacturers is print mechanisms that withstand reasonable levels of electrostatic discharge.

Power Consumption

Power consumption will be another sensitive area, not simply because of rising energy rates but because of equipment costs for accommodating heat. For example, incorporating high-energy magnetic materials in the printer's hammer mechanism not only

reduces hammer power consumption by 60% but also eliminates the necessity of cooling the hammer bank — a dual end-user benefit.

Reliability, although intrinsic to lower heating, has in the past taken on the "numbers game" connotation with dull mean-time-between-failure (MTBF) figures that have very little meaning to anyone but reliability engineers. As printers are applied outside of metropolitan areas, reliability will take on its true meaning — part of the ownership cost.

Small systems and remote terminals are sold on their low cost and are often located many miles from the closest service center, making repairs both

time-consuming and costly.

With rising labor costs, difficulty in obtaining trained technicians and a more widely dispersed customer base, systems manufacturers will look closely at MTBF figures; end users will expect their equipment to work all of the time, for practical purposes. When there is downtime, inexperienced operators will probably have to diagnose the problem and describe it over the telephone.

Thanks to the microprocessor, future printers will have more intelligence; not simply for control but to provide diagnostic routines. Distributed networks, stand-alone computers and ter-

(Continued on Page S/10)

WHO DOES THIS PRINTER THINK IT'S KIDDING?



If the M-200 wants to go around acting like a line printer, we're not about to stop it.

And that's exactly how it does behave, cranking out an effortless 200 lines per minute, average throughput.

But the truth is, the M-200 is a serial printer. Which should certainly be obvious from the extremely reasonable purchase price of about \$2000. (In OEM quantities.)

And so, if the M-200 delivers performance that can fool you, blame it on its design features.

Like our revolutionary 14-wire, dual-column print head, for instance. The design combines the flexibility of a single head with the speed and long life of multiple heads. (You can expect more than a

year's use out of the head.)

Any operator can change the head easily.

And, like all products from The Printer Company, it's a dependable workhorse. Made even more so by its optional self-diagnostic system.

If something needs attention, the system tells you if you can tend to it yourself. Or if you can't, you know what to tell the serviceman. That can save him a trip, saving you down time and money.

And that's the inside story of the M-200. Acting like something it's not? Maybe. But since its delusions are all in your favor, why complain?

THE M-200 MATRIX PRINTER

THE PRINTER COMPANY



Call or write for your nearest Sales Office or Distributor. 6219 DeSoto Ave., Woodland Hills, Ca. 91365. Tel: (213) 887-8451
Telex: 67-4734 • Darmstaedter Landstrasse 199, Frankfurt, W. Germany. Tel: 681-034, Telex: 841-416344.

Flatbed, Drum Plotters Differ in Advantages

Digital plotters available today can be classified by the type of plotting surface provided, the recording technique used, the method of line drawing and the method of specifying the plot. From the standpoint of the operational mechanism, perhaps the most useful classification is by the method used to mount the plotting surface on the plotter.

The two usual categories for this classification are flatbed-type plotters (in which the plotting head moves along two dimensions over a fixed plotting surface) and drum-type plotters (in which the plot is produced by a combination of the motion of the plotting head from side to side and the motion of the plotting surface backward and forward).

Flatbed plotters incorporate a fast plotting surface ranging in size from 30 in. by 30 in. to 5 ft. by 24 ft. The

This article is excerpted from Auerbach Publishers, Inc.'s Input/Output Reports, a three-volume reference on all major facets of peripherals and data handling equipment.

paper generally remains stationary throughout the plotting of a single graphic image. The plotting mechanism performs all the necessary movements, although automatic paper feed is available optionally for many flatbed plotters but is used only between one

graphic image and the next.

Paper, or another plotting medium, is usually held to the plotter surface by a vacuum applied from below. Generally, the plotters are operated with the plotting surface horizontal, although some models have a tiltable surface and can operate with the surface in any position from horizontal to vertical.

The writing mechanism consists of a carriage and writing-tool assembly that moves along one axis of the plotting surface while the tool assembly is also free to move along the other axis. Motion in the X or Y direction or in both directions simultaneously is thus possible, enabling the plotting tool to reach any coordinate value within the plotting area. Usually the positioning

mechanism for flatbed plotters consists of screw drives in the X and Y directions, which may be actuated by digital or analog signals.

Versatile, But Expensive

Flatbed plotters are generally more versatile, accurate and expensive than other types of plotters such as the drum-type, but such options as multiple-tool heads or photographic plotting attachments are frequently offered because the plotting head is mounted on a large moving assembly.

Drum plotters feature a movable plotting surface in conjunction with a writing carriage to provide the required two-dimensional motion. In these units, the writing element moves along one axis while rotation of the drum supplies movements along the other coordinate.

Most units employ an incremental plotting technique that produces a graph by a series of fixed incremental steps of the drum and/or carriage. Bi-directional motors are used to control motion along both the X and Y axes so that each input digital signal causes a small incremental step (.01 in. or less) of the carriage, the drum or both. A third (z-axis) input signal is used to control the raising and lowering of the pen from the surface of the paper.

Compared with flatbed plotters, drum-type plotters are compact and low in cost and offer the capability to produce single plots as long as the roll of paper. The main disadvantages are that they can only produce plots on paper with a single tool, since paper is the only medium that can be fanfolded or rolled suitably and the plotting head assembly will support only a single plotting tool.

For applications involving large amounts of paper, and where accuracy is not paramount, drum-type plotters offer an attractive solution to equipment requirements.

Film plotters produce output on photographic film but are not strictly a separate class of device since optical plotting heads are available for many table-type plotters.

Film plotters, because they use light-sensitive material, have given birth to many specialized techniques. One type of system uses a CRT projection medium to generate an image on photographic film. Another approach utilizes a laser beam deflected by a mirror to generate an image directly on film by left-to-right scans.

Advantages of the laser-type plotting technique are that plots in different shades of gray can be produced by modulating the beam, and plots as long as a roll of film (100 ft.) can be produced — something particularly important for seismic applications.

Photo Plotting's Disadvantages

A disadvantage of photographic plotting in general is the need to complete the plot and process the film before the plot can be inspected, although rapid photographic processing machinery is now available. Some vendors have developed a CRT display for use with photographic plotting systems that allows plot data to be checked visually before the plotting starts.

Electrostatic plotters, also known as nonimpact printer/plotters, are being used with increasing regularity in both

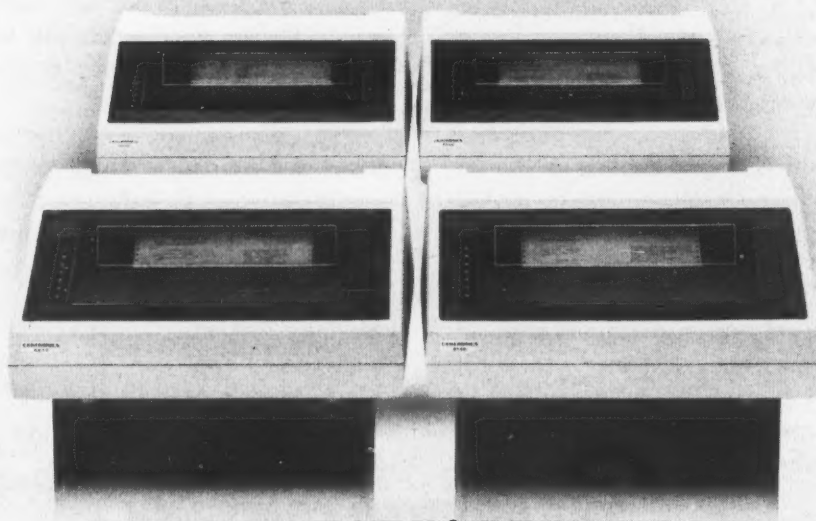
(Continued on Page S/10)

Does 35 day delivery make Centronics' line printer family the best?

NO. Centronics 6000 series band printers have much more to offer than just fast delivery; 85% parts commonality and technical features like an operator-changeable print band with a choice of several character sets and microprocessor control, for example. Four models — providing superior print quality and a range of print speeds—75, 150, 300 and 600 lpm, plus design simplicity that provides exceptional reliability and makes the 6000 series a true family of low priced, fully formed character line printers.

And, as with Centronics' matrix printers and teleprinters, the 6000 series is backed by the largest worldwide service organization of any printer company, and Centronics' reputation for reliability.

Write or call for complete 6000 series information. Centronics Data Computer Corp., Hudson, NH 03051, Tel. (603) 883-0111.



CENTRONICS' PRINTERS
Simply Better

For Drafting Jobs System Speeds Design Turnaround

Special to CW

MIAMI — A manufacturing company here, active in the truss plate design industry, has managed to cope with the problem of engineering turnaround times by installing a computerized drafting system.

Monex Corp. uses the system to produce complicated drawings and designs of trusses, the frames used to support the roof or floor of a building. When builders who are bidding on construction jobs call the company for estimates, "they want to know what the truss is going to look like, what kind of lumber is going into it and, of course, what plates are needed in order to bid," Len Naurison, vice-president and director of sales, said.

Using the system, civil engineers at Monex can produce in four minutes a drawing that would normally take a

called back to the builder and the drawing can be forwarded to the customer the same or the following day — or it can be stored in the system's memory until needed.

Customers also have the option of purchasing a terminal through which they can operate the plotter system off-line or through the telephone. These customers give the necessary specifications to the firm's operator verbally, or they enter coded information directly into the system by phone.

The computer will accept the information and process it while the customer is on the line or hold the request until the machine is available. Again, the drawing can be forwarded

to the builder at once or held until he is ready to build, Naurison noted.

The information fed into the system by the builder includes such statistics as lumber sizes and grades, plating information and all the necessary forces and span data such as dead load, live load and bottom force, Naurison said.

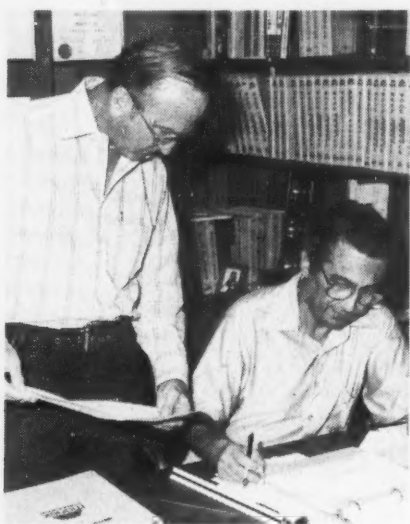
Partial Specs

"Unlike drawings done by hand," he added, "we don't have to allow a margin for error. In fact, if a customer furnishes the proper load and code requirements for a particular job, we can determine final figures even if we're given partial specifications, something

(Continued on Page 5/16)



Drum plotter draws floor and roof trusses based on information supplied by builders.



Monex Corp. vice-president Len Naurison and chief engineer Mehmet Ilter compare a customer's specifications with similar plans in the company's library of truss design. Ilter prepared floor and roof specs and the system completes drawing with lumber, plating, forces and span information.

draftsman three days to two weeks to complete, he said.

When the company decided to purchase a computerized drafting system, Naurison said, the most important consideration was the plotter. "We needed a machine that could turn out the very complicated drawings we require" while at the same time retaining "the speed and reliability demanded in this business."

The company selected a California Computer Products, Inc. Model 936 plotter, which is driven by a Hewlett-Packard Co. 9640A minicomputer.

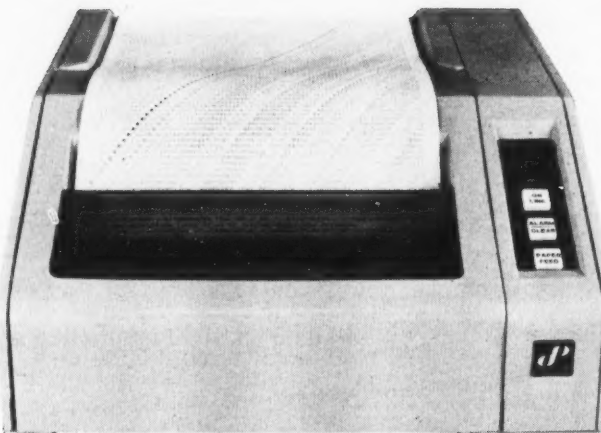
Going Strong

"We've been operating eight hours a day for four years," Naurison explained, "and we still haven't found any limitations to the systems."

Monex customers have a number of ways to obtain the truss information they require, Naurison said. Builders may call the company, using a toll-free number, and provide the operator with details about the proposed project. This information is coded and entered into the computer and, within minutes, a permanent working design is completed.

Appropriate information can be

KEEPS QUIET. WORKS HARD. FOR VERY LITTLE.



Our T-80 Receive

Only printer is a quiet, unassuming sort.

Doesn't take up much room on the desk.

Doesn't make a racket while it's doing its work.

And it doesn't require a lot of

money before it'll go to work. In fact, the T-80 runs less than \$900 in OEM quantities. And it continues to save you money with its low cost of ownership.

On top of all this, the T-80 prints fast. 80 CPS fast. Which is nearly three times faster than most other thermal printers.

All these qualities — low price, impressive speed, high quality, and quiet operation — have combined to make the T-80 an absolute natural for applications that demand silence. Hospitals. Open office situations. Testing and instrumentation.

THE T-80 THERMAL PRINTER

have to buy a T-80 RO to get T-80 performance. The basic T-80

mechanism, with the same unique operator-replaceable print head and driver electronics, is available as a module: the T-80 M.

So, it's up to you. Buy the complete T-80 RO, ready-to-run. Or just take the T-80 M mechanism and design your own printer around it.

Either way, you save money, and the T-80 goes quickly and quietly about its business.

And the T-80 is the logical supplement to your CRT if you want occasional hard copy printouts.

Now, you don't



THE PRINTER COMPANY

Call or write for your nearest Sales Office or Distributor. 6219 DeSoto Ave., Woodland Hills, Ca. 91365. Tel: (213) 887-8451
Telex: 67-4734 • Darmstaedter Landstrasse 199, Frankfurt, W. Germany. Tel: 681-034, Telex: 841-416344.

COM Turns Brokerage Into Publishing Concern

(Continued from Page S/2)

The leased FR 80, a stand-alone system, is fed by a tape generated from a 1G-byte disk that stores the data base generated by the B6700. The mainframe generates that data base through a communications system that collects data from stock market sources such as the Securities and Exchange Commission and Interactive Data Corp.

Upgrade Awaited

At the present time, O'Neil is awaiting delivery of Comp 80/2, an upgrade to the FR 80 system. The user will also lease that machinery.

"The new system will do the graphics work the same way as the old system," Griffiths said, "but the upgrade will allow us to get more of a typeset, profes-

sional appearance and will provide a variety of applications not available with the older system."

For instance, Griffiths is excited about the variable-spacing capability of the Comp 80/2. Presently the user is printing in stick characters, which were designed for microfilm applications, not publishing. The variable-spacing feature will provide compaction and enhance the appearance of the output.

Multiple fonts are another feature which will improve the output's aesthetics. In addition, Griffiths noted, the latest system has a lot more available software. He summed up the upgrade by saying, "It's a lot more for the money."

In trading up, Griffiths said O'Neil did not consider products from any of

Information International's competitors because, in his opinion, there is no competitive device that would do the variety of work required by the company.

Even though the Comp 80/2 has yet to be installed, Griffiths is anticipating future upgrades. In the next couple of years, he expects to add the rest of the features available with the system.

Specifically, the company is eyeing a scanner feature which can be fed images, convert them to digital form and then recall them in rescaled, rotated or otherwise modified form. Griffiths foresees the use of this feature for on-line, time-sharing applications, such as viewing real estate offerings.

Although the computer generates microfilm output, Griffiths said O'Neil

has never sold one piece of microfilm. Instead, the company has developed a projection platemaker that burns printing plates directly from the 35mm film output.

Currently O'Neil has nine presses pounding out the weekly \$1,000-a-copy *Datagraphs* subscribed to by 250 users. The firm also has seven other products relating to the stock market, securities and the economy which have evolved from the same data base. These range from custom reports to magazine formats used by more than 10,000 customers.

Recently, O'Neil expanded its operations to publishing parts catalogs and manuals for 40 customers including Toyota, Kawasaki, Pacific Telephone and Merrill Lynch.

The entire operation is handled on the premises.

WHY QUANTOR'S ON-LINE COM WORKS HARDER FOR YOU.

It's a true peripheral, under your control.

Quantor's on-line COM is a high-speed output device that becomes an integral part of your DP systems operation — right at home in the computer room. For the first time, DP managers can have direct operational control of COM. Scheduling is controlled by the computer, automatically. And there's no tape-transfer slowdown, because manual tape handling is eliminated. Quantor's on-line COM produces microfiche for duplication in only four minutes. And you get some other special advantages with Quantor, too. Like microprocessor control for buffering and minimizing channel contention; our patented automatic slide form alignment; and

in-line, archival film processing — eliminating the conventional two-step method.

It's instant feedback for your programmers.

In addition to its traditional use for report generation, on-line COM will have a valuable new application in your computer room: it's an instant alternate output device for application and systems programmers. It can produce titled fiche in minutes for dumps, system lists, program listings and console logs — all with no software requirement. Side-stepping printed output for these applications saves time. And since you eliminate 30% of the paper generated in the computer room that normally never leaves it, you save money too.

Quantor's on-line COM is available in two versions: the Q115 or Q118 on-line/off-line COM with a front-end minicomputer that eliminates host computer software requirements, and the Q1020 on-line COM



Q118 on-line/off-line recorder/processor.

using proven Quantor host computer software. We're with you every step of the way, because COM equipment, installation and service are Quantor's only business. Call your Quantor representative. When it's time for COM, it's time for Quantor.

Quantor

Q1020 on-line COM recorder/processor.



Color CRTs To Come of Age

(Continued from Page S/3)

the coin, both color-coded alphanumeric and color graphics are playing increasingly crucial roles.

With the addition of color, businesses can develop programs that will display and color code their inventory based on quantities at hand. For instance, green might designate fully stocked items; yellow, items that need to be reordered; and blue, out-of-stock items.

Utility companies have turned to color graphics to be able to quickly locate system components, and in energy management, color graphs or charts give meaning and vitality to statistical data on how to cut a peakload or spread it out more evenly.

However, from the very beginning, educating end users as to the advantages of color has been a slow process. And for those with the foresight to see the advantages, high prices invariably became a major stumbling block. But as color comes in line with black-and-white prices, there has been a major shift in buying attitudes.

End users are realizing that if they can incorporate color terminals into the systems they are upgrading with new terminals, they will be buying more efficiency. And by the same token, if systems manufacturers can offer their customers color at a black-and-white price, they are marketing a better product.

Muench is vice-president of research and development for the Intelligent Systems Corp.



'Somehow It Doesn't Seem Fair to Settle Sports Arguments With a Portable Computer.'

Corporate Headquarters: 520 Logue Avenue, Mountain View, CA 94043
Atlanta (404) 256-4370, Boston (617) 848-7436, Chicago (312) 654-3720, Dallas (214) 233-6651, Detroit (313) 569-6390,
Houston (713) 444-1774, Los Angeles (714) 751-1932, Minneapolis (612) 944-1259, New York (212) 594-4570, Philadelphia (215) 568-2250,
Pittsburgh (412) 261-5866, San Francisco (415) 871-2650, Seattle (206) 453-1123, Tampa (813) 461-4685, Washington, D.C. (301) 997-1330.

WITH ITTEL'S NON-IMPACT PRINTER, YOUR \$61,526.00 SAVINGS* COULD LOOK LIKE THIS.

Forms Overlay optical image system prints high quality document and report formats, designs or other constant data. Format and variable data merge under program control.

Multiple choices of type style, font size and column spacing within a single line.

The 7800 printer reproduces photos electro-photographically.

Prints on single part continuous forms in an infinite range of paper sizes from 6.5" x 3.5" to 15.8" x 14".

20 standard character sets.

ITTEL
CORPORATION

COMPUTER PRODUCTS DIVISION
ONE EMBARCADERO CENTER
SAN FRANCISCO, CALIFORNIA 94111

PAY

TO THE ORDER
OF

ANY CUSTOMER

SIXTY-ONE THOUSAND FIVE HUNDRED TWENTY-SIX AND 00/100

DOLLARS

DATE 4/3/78

\$ 61,526.00

NON-NEGOTIABLE ADVERTISING

John Coe
PRESIDENT, COMPUTER PRODUCTS DIVISION

⑈000000⑈ ⑆0000⑈0000⑈ 000000000⑈0000

Not only does Itel's new 7800 Non-Impact Printer do everything the IBM 3800 does, but does it for less.

And money isn't all you save — the Itel 7800 printer takes up about one-third less floor space than its IBM counterpart. Plus, our uncomplicated paper path means easier, faster loading. So, with Itel's 7800, you save time, save space and save money.

Of course, all 3 models of our 7800 are 100% functionally com-

patible with IBM operating systems and the IBM 3800. And, except for two-channel switching, all optional IBM features are standard on all Itel 7800 models.

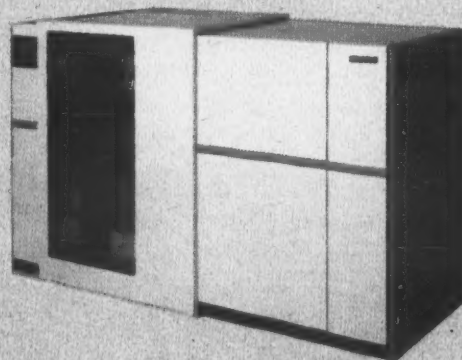
Equipped with Forms Overlay and 20 standard character sets, our 7800 can be used for many varied applications, from inventory control to payroll checks.

Itel has always specialized in providing sensible alternatives to IBM. Now our 7800, the only 3800 functionally compatible non-impact printer available, provides you with the kind of unparalleled savings that are making Itel the only alternative.

ITTEL
CORPORATION

Data Products Group

One Embarcadero Center
San Francisco, California 94111
Telephone: (415) 955-0000



* Savings during the first year, in terms of purchase price and average monthly use of 1.5 million ft. of paper.

Diversity in Store as Printer Design Advances

(Continued from Page 5/5)

minal operators will perform DP operations as a secondary function. Their primary function may be management, nursing, secretarial work, material receiving or a host of other occupations.

When the print operation ceases, the operator will press a button. The printer will determine, for example, whether the printer, the CPU or the communications network is at fault. Further routines will report the problems quickly. The operator will be prompted to correct minor problems, eliminating many unnecessary service calls.

Should repairs be necessary, the operator will be able to more accurately describe the problem. When the

repairman arrives, he can bring the necessary replacement parts and tools, alleviating unnecessary delays.

Despite increased reliability and intelligence, printer prices will decline over the next five years. The case of the 300 line/min line printer is a classic example. Its single-unit OEM price has dropped from \$18,500 in 1962 to \$7,700 in 1968 to \$4,500 in 1977. The same trend is true in any speed class.

There is an average 7%/year decline in printer prices. This is not caused by price erosion but by new development. As new printers are designed and introduced, in about three-year cycles, the annual price reduction averages 7%.

Growth among the various segments of computer applications will change

the printer market's complexion in many new areas while increasing shipments in more mature markets.

In the independent market, impact printers will continue to dominate with over 270,000 units compared with 150,000 nonimpact units. Form character printer deliveries will lead the impact field with 39%, followed closely by line printers with 36%. Serial matrix printers will make up the remaining percentage.

Character printers, because of their slow speed, are expected to find more applications in the word processing or office information areas — when print quality and paper handling are important qualities. They will constitute only about 20% of the dollar market, however.

Line printers will continue to be the workhorse of the computer industry with applications in general-purpose, minicomputer, small business systems and terminal areas.

By 1982, line printers will represent nearly 60% of the total independent manufacturers' dollar share of the impact market and over 44% of the total market.

Serial printers, because of their relatively wide 60 char./sec to 400 char./sec speed range, will find more applications in the minicomputer, small business machine, terminal and microprocessor system areas. The annual delivery rate in these areas is expected to double during the next five-year period, contributing about 20% to independent printer manufacturer's revenues.

Because it is a relatively new technology, nonimpact printers (with only about 3,500 units delivered in 1976), are expected to experience the greatest growth rate during the next five years.

By 1982, the nonimpact printer is expected to be applied across the board from large-mainframe installations to highly remote terminals. The predominant use will be with minicomputers on down, principally because of the thrust of manufacturers with low-cost, general-purpose printers.

For all of their glamour, the ultra-high-speed electrostatic, xerographic and ink-jet printers will have small impact on the overall market. The \$145,000 to \$310,000 price range will tend to limit the number of installations to those large systems that require extremely high output.

Impact printers will still dominate the market for most general applications, but there will be increased use of non-impact printers for specific applications in which price/performance or convenience is superior to the other approaches.

Kenneth C. Freund is with the Business and Planning Office of Dataproducts Corp., Woodland Hills, Calif.

Plotters Differ In Advantages

(Continued from Page 5/6)

scientific and business applications.

In an electrostatic plotter, the paper moves in one direction passing over a row of fixed styli spanning the width of the paper. These styli, or writing electrodes, which may be spaced at up to 200/in., create small electrostatic charges on the paper at the active styli positions. The paper is then exposed to a toner, producing a permanent image.

The prime advantage of this type of plotter is speed, especially of character generation. This is because characters are of the dot matrix-type and do not have to be drawn as is required with other types of plotters.

There are, however, two disadvantages: resolution and special programming. The resolution is not high enough for fine drawings, such as those needed in cartography or integrated circuit mask design. Special programming is required since lines and graphs are not drawn point to point as in other plotters and consequently, data must be stored and programmed to come out serially, one line at a time.

COMPLETE PRINTER SYSTEMS AT 300 LINES PER MINUTE FOR \$6250*

Available now for
IBM SERIES/1
DEC PDP11
DEC PDP8
HP 21MX,
1000, 2000
DG NOVA

3240
line printer

- Installed and Serviced Nationally by CUC
- 132 Character Line Handles Forms from 4" to 15" Wide
- Full 64 Character ASCII or 96 Character Upper/Lower Case
- Clear Impact Printing on Multiple Copy Forms
- Operates up to 2000' from Processor (Supplied with 50' Cable)
- Software Transparent

FOR MORE INFORMATION CALL OR WRITE

CUC

computer usage company
8433 warren ave. norcross, georgia 30092
404-449-8310

*Price includes Interface, Controller, Cable,
Pedestal, & Paper Receiver
Quantity and OEM Discounts Available. IBM Series/1 Model 36750.



10 YEARS AGO THERE WAS AN IMPORTANT EVENT: THE CARTERFONE DECISION TODAY, THERE IS A MULTI-BILLION DOLLAR INDUSTRY...

On June 26, 1968, the FCC handed down the landmark Carterfone Decision, creating a competitive marketplace for communications products and services. Since '68 many data communications users have made their own "Carterfone Decision", selecting Carterfone as equipment and service supplier.

This year — the 10th Anniversary of the Carterfone Decision — marks a decade's growth, achievement and advancement of a competitive communications industry. Carterfone is

proud to have played a role in the industry's development, and Carterfone continues its commitment to serving the needs of data communications users.

Carterfone

• A Member of the Worldwide Cable and Wireless Group.

1111 W. Mockingbird Lane, Suite 1400
Dallas, Texas 75247. Phone: (214) 630-9700.



Sales & Service Offices:
 Atlanta, Boston, Kansas City, Los Angeles, Memphis, Miami, Milwaukee, Minneapolis, New Orleans, New York, Norfolk,
 Oklahoma City, Omaha, Orlando, Philadelphia, Phoenix, Pittsburgh, Portland, Raleigh, Sacramento, Saginaw, San Antonio,
 San Diego, San Francisco, Seattle, St. Louis, Syracuse, Washington, D.C.

Develop Specific Plans for COM, Users Urged

Special to CW
BOSTON — Designing an efficient computer output microfilm (COM) system requires three essential elements: purposeful planning, careful data collection and thorough follow-through, according to Robert Ocon, a marketing vice-president with U.S. Datacorp.

Addressing a group at the National Micrographics Association's convention here

last month, Ocon stated that many project leaders responsible for developing a COM system for their organization err by failing to develop a "specific approach." COM systems design, Ocon stressed, is essentially a three-phase process involving planning, which encompasses the setting of specific objectives; involvement of key personnel; and finally, soliciting involvement by top management.

Saving money is probably the most common objective, in using COM, but many project leaders do not set a specific amount in hard dollars, Ocon said. The goal should be challenging enough that it will motivate people, but more importantly, gain the attention of cost-conscious senior executives who might otherwise ignore the project.

At least four groups of company personnel should be in-

involved in COM development from the beginning. Representatives should include people from DP, systems, user and records management areas because they are the focal points of the data collection system, according to Ocon.

'Firing Up' Management

Several techniques exist to generate management enthusiasm and involvement but perhaps the most effective is

the broad distribution of a letter or memo from a high-ranking company official. Such a message should point out the importance of the project, the executive's personal commitment and the need for organizationwide cooperation, Ocon explained.

After planning, the next phase is data collection, which generally includes compiling a list of all data processing reports, identifying potential COM applications, eliminating those applications that are inappropriate and preparing a special analysis of small reports and cost comparisons.

To maximize potential COM benefits, a prospective COM user should analyze all reports produced by the DP department — including reports for the DP department itself — to ascertain their suitability for COM, Ocon continued.

Some of the key information to consider, Ocon added, is the report title, frequency, pages per run, number of copies and pages per month.

To identify prospective COM applications, extremely large reports in the thousands of pages are an obvious beginning. However, Ocon stated, a report with as few as 500 pages per run or requiring four or more copies should also be carefully considered. The key elements to analyze are whether preprinted forms are used, what distribution method is used and how the reports are handled by users.

Annotation frequency, updatability and distribution to multiple users are also major considerations as well as whether queries are made by phone, whether copies must be mailed, how much research users do, whether reports are passed along from one department to another and what record retention requirements there are for internal, legal or tax purposes, Ocon pointed out.

However, Ocon cited certain types of applications that should be eliminated from considerations:

- Applications that in themselves are turnaround documents.
- Those physically divided between individuals or divisions or in which data is confidential to some degree.
- Those with excessive annotations.
- Applications in which a hard copy has to go to the customer and only that copy is created.

Special Challenges

Small reports present some special challenges and are generally produced on a conventional printer because of the data's time requirements, Ocon said. Combining reports that are used among systems
(Continued on Page S/21)



AutoCOM.™

A computer output microfilm system that's simple enough to use in-house.



And easy enough to afford.

In-house computer output microfilm used to be a complicated, expensive operation. But now there's the AutoCOM system from Datagraphix, the world leader in COM. AutoCOM gives you cut, dry, archival quality microfiche with push-button simplicity. No complicated installation. No special training. And no messy film processing. For less than \$65,000,* you

get the fully self-contained AutoCOM and AutoFICHE™ duplicator; it's a powerful pair for complete in-house COM capabilities. Three convenient models operate on-line, off-line, or through a mini to your computer. Use the coupon to get complete details on AutoCOM. The system that's simple enough to use in-house and easy enough to afford.

*Purchase price FOB San Diego, applies only to continental U.S., subject to change without notice. Maintenance available at additional charge.

Datagraphix®

Datagraphix, Inc.;
a General Dynamics subsidiary;
P.O. Box 82449; Dept. C6A
San Diego, CA 92138;
Phone (714) 291-9960

Please send me details on in-house COM with AutoCOM.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone _____

High Energy Density, Directional Laser's Features Make It Viable Print Medium

By Edward V. Ince

Special to CW

ROCHESTER, N.Y. — When used as alternatives to conventional writing instruments, conventional light sources such as tungsten filaments or arc lamps are wasteful since they emit their light spherically. When these light sources are used to illuminate the limited aperture of the usual optical system, only a small fraction of the emitted light is actually put to use.

Conventional light also contains many different wavelengths, sometimes requiring filters to control the spectral characteristics — but filters waste much of the originally available energy.

The laser, however, has many features that make it a viable alternative as a printing medium in computer output microfilm applications. First, the

an angle to the waves, the ultrasonic waves cause the beam to be separated, or diffracted, into a fan of nine beams that write the characters. The laser beam, in effect, becomes an electronic pencil of light, writing its data at electronic speeds.

Film choice is also an important consideration in laser printer technology. There is a definite relationship between any surface the user wants to make a mark on and the vehicle for making that mark. Generally, film responds to light much in the same way that paper responds to a pencil — if you press too hard with a pencil or use too light a stroke, the mark will be too dark with ill-defined edges or too light

to read.

Similarly, too much light on film will cause overexposed, poorly defined images, while too little light produces an image too faint to be legible.

Varieties of Film

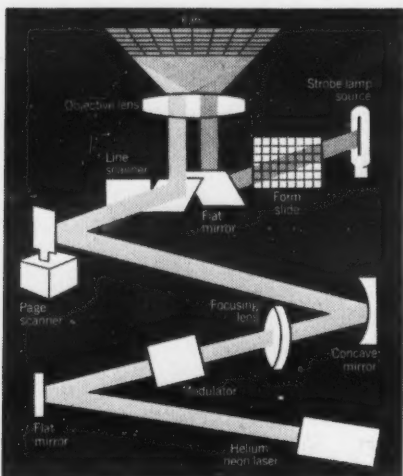
Films differ in several ways. One of the most important concerns is how much light needs to fall on the film to get an acceptably developed image.

The key to this lies in the size and the dispersion of light-sensitive materials (usually silver halide crystals) in the emulsion. The finer the grains, the less area each has to receive light and the more light it takes to make an exposure. Finer grain films offer a special

advantage. If enough light is used to produce an acceptable image, finer grain films can record sharper characters than films sensitive to light.

Dry processing is also, from a user's standpoint, more desirable than traditional wet methods that require a darkroom and several chemicals. After the film is exposed, in a "dry" environment, the film image is developed in a dryheat process by passing it over a heated drum. The heat causes the recorded image to be amplified up to 1,000 times, resulting in both sharpness and clarity of the character image.

Ince is the director of product programs and photographic project coordinator for the Eastman Kodak Co.



Data recording is accomplished by advanced laser technology on a dry laser film.

laser's energy is concentrated in a light beam that is relatively small to start with and which can be focused on an extremely small spot. This concentration results in a very high energy density.

Second, the laser is inherently highly directional so its energy is emitted in a unidirectional bundle without the need for elaborate collimating optics.

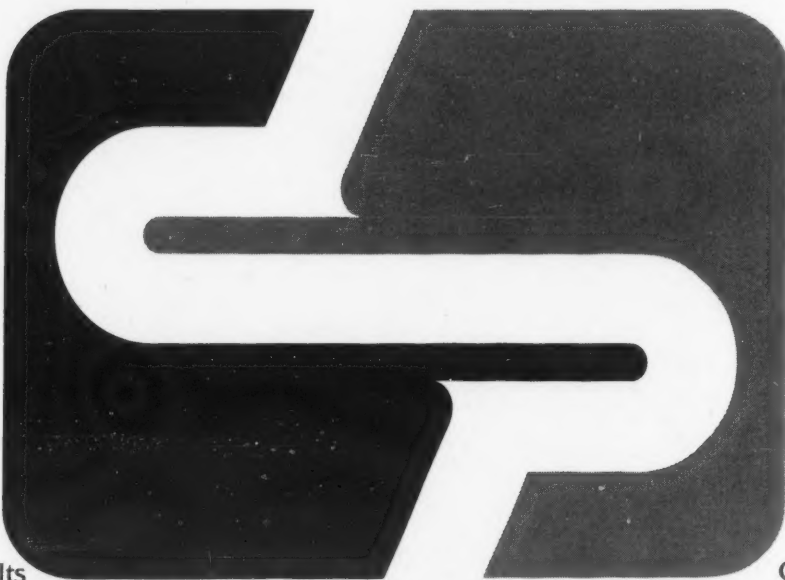
Third, the laser's energy is monochromatic, or of one wavelength. This characteristic combines with constancy of phase to define coherence. It is the quality of coherence that enables the user to manipulate the laser beam at accelerated speeds.

Basically, the user doesn't care whether information is recorded with a laser or a paint brush as long as the company's objectives are met. Along with these objectives, the user looks for both speed of output and, naturally, a low cost.

The laser, which operates via principles of deflection and modulation, was at first relatively slow because early units incorporated mechanical gadgetry, rotating mirrors and complex optical systems. Recently, however, research teams have discovered that the coherent properties of the laser make it uniquely qualified for manipulation at electronic speeds.

Many laser units today use an acousto-optic modulator which is a glass block attached to electronically driven transducers that send ultrasonic waves through the glass. When a laser beam is directed through the glass at

New Symbol. New Home. Old Reliable DPC.



It took us a decade of growth to develop this new symbol. Its

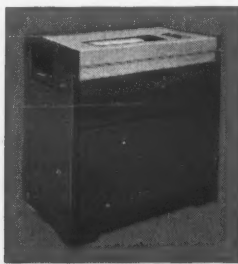
subtle intent is to symbolize the fact that Data Printer Corp has become a world leader in the computer line printer field. We not only manufacture the world's most popular make of OEM line printers — ChainTrain® — we've also built a brand new line of band-type printers, our Band Line 3000 Series.

In fact, the demand on us has been so great, we've had to move to new, greatly-expanded headquarters in Malden, Massachusetts. It's just a can-nonshot away from our previous production

facilities. Now, we can serve you in meaningful OEM quantities.

Shown in the right-hand photo is our famous Chaintrain® 1200 Series Printer offering line speeds from 600 to 1200 LPM's. The left-hand photo shows our new Band Line 3000 Series offering line speeds from 75 to 600 LPM's. And shown at the top is our brand new look . . .

a new trademark for more instant recognition. More than ever, this new trademark will represent the mark of quality in computer line printers. It's a better look for a bigger and better Data Printer Corp!



DATA PRINTER CORP
99 Middlesex Street, Malden, MA 02148
Tel: (617) 321-2400 TWX: 710-348-0794
Sales Offices: Costa Mesa, CA, Clifton, NJ, San Jose, CA

For Users Making Purchase Decisions Independent Peripherals: More Than Cost Vital

Independent peripheral manufacturers are offering plug-compatible disk and tape systems at prices sometimes 10% to 15% below those of mainframe vendors.

Although cost is a crucial factor in user selection of a peripheral, there are others that should be taken into consideration.

These additional factors are discussed in the following excerpt from Auerbach Publishers, Inc.'s Input/Output Reports, a three-volume reference on all facets of peripherals and data-handling equipment. The reference guide is updated monthly.

Special to CW

Lower cost, equal and somewhat improved performance and flexible lease terms are the major incentives when considering conversion to plug-compatible replacements. Major factors to be considered, in addition to any price advantages, are the vendor's ability to support the installation, the equipment's design features and performance and the type of maintenance service provided.

Since IBM has the largest share of the marketplace, most vendors design their plug-compatibles as IBM replacements. The first step, for users of IBM equipment, is to re-evaluate their current installations and determine whether a simple conversion or a more substantial upgrade is needed.

Some users prefer to maintain a single-vendor installation. They remember the pitfalls that used to develop in multivendor installations. These users want to avoid the quibbling among vendors' customer engineers because their efforts to fix the blame for malfunctioning equipment can be tiresome and costly.

In the plug-compatible disk sector, however, these problems generally don't occur because independents and IBM's customer engineers usually don't disagree, particularly if the user receives his original disk system from IBM. In that case, IBM customer engineers will install the equipment and ensure that all hardware and software bugs are eliminated, simplifying the user's job of converting to a plug-compatible disk system.

Vendor Reputations

With increasing frequency, DP personnel are selecting their equipment on the basis of vendor reputation. The ingredients that determine a vendor's reputation are hard to define. In fact, two equally perceptive users may strongly disagree about the qualities of a specific vendor or his products.

However, there are factors that help a user to determine a vendor's stability and responsiveness to his customers' needs.

A user can gauge the past performance of a vendor by checking the length of time the firm has been in business. Presumably, an established firm has been providing satisfactory products to its cus-

tomers and will probably remain in business and continue to provide service, maintenance and product upgrading.

However, a new product can have bugs even if introduced by an established vendor, so the user should know exactly when the product was first delivered.

As part of the investigation of a firm, the user should find

out the location of the sales office, since a local vendor is more apt to provide better service. Since the vendor is not necessarily the manufacturer, the user would do well to investigate this point.

Also, a significant OEM market can be a plus factor in favor of the vendor. OEM business expands a manufacturer's production volume,

lowers his costs and can improve his profitability via a more positive cash flow.

The electrical environment and facilities of the user's site are important considerations when choosing plug-compatible devices. Unless special circuitry and shielding are provided, electrical signals can be degraded when traveling
(Continued on Page 5/18)

Bye, Bye D

\$1795*
A Perkin-Elmer CRT
and a 100 cps thermal page printer.

If you buy a DECwriter after reading this ad, you deserve it.

Our popular Pussycat Printer and Model 1100 Interactive CRT Terminal. Together, they do a lot more than a DECwriter III and cost less.

In fact, at \$1795, it's like buying a top-quality printer and getting a terrific little CRT free.

And what a CRT! The Model 1100 displays 80 characters per line in an easy-to-read, 9 x 12 matrix and communicates at up to 9600 baud. Compare that to DECwriter III's puny 1200 baud.

Then when your results are ready, touch the PRINT key and the Pussycat printer lays down a whole screenful of characters in only 20 seconds. But, best of all, the CRT is ready for use again in 2 seconds or less. So the operator can go right back to work.

The Pussycat Printer is silent, too. And, because you print only what you want, there are no mounds of unsightly printout around the machine.

Clean. Quiet. Inexpensive. The Pussycat Printer and the Model 1100 CRT from Perkin-Elmer. Compared to a DECwriter III, they do more and cost less.



*U.S. domestic price, quantity 75.
Model 1100 and Pussycat Printer: \$2795, quantity 1.
CRT-1200 and Pussycat Printer: \$3695, quantity 1.

DECwriter is a registered trademark of Digital Equipment Corp.

Mini, Printer Help Launch Publishing Venture

Special to CW
SAN FRANCISCO — A graduate student here used a minicomputer and a data communications terminal/printer to not only help him complete his Master's thesis but also form a fledgling publishing company as a result of his research.

Bruce M. Spence, manager of sales support for *Standard and Poors' Fixed Incomes Systems, Inc.* and a recent gradu-

ate of New York's Pace University, decided to alter the traditional process of preparing a Master's thesis, opting to forgo the reams and reams of note-taking and long hours at the typewriter. He streamlined the process of collecting a large volume of data, then took his thesis a step further, turning the project into a valuable resource book and at the same time establishing a company to publish his work.

Spence's book, *The Inside Source*, contains information on 26 contemporary, business-related fields. This includes everything from accounting, advertising and marketing to global economic development, international trade, transportation and urban development, Spence said. The book is actually an annotated bibliography of free publications on business, economics and management

available from private and governmental sources.

Spence used a Hewlett-Packard Co. 3000 computer system, located in California, linked via the Telenet Communications Corp. network to a Diablo Systems, Inc. Model 1620 Hyterm terminal/printer stationed in New York. He then created a complete data base software system that enabled him to perform much of the research required for

the book's compilation.

Spence, along with friends Joseph P. Adams Jr. and Peter deLucca, formed Quad International Corp. to market the book, and the group used the terminal/minicomputer arrangement to computerize the company's mailing lists, inventory control and accounting systems.

The terminal/printer and a modem were purchased by Quad International for approximately \$3,500. According to Spence, "Diablo was terrific. Its representatives treated us with the same courtesy and helpfulness as they would treat any of their much larger customers."

"The Hyterm was central to the project. We not only used it as an I/O terminal, allowing us to access the computer system in California, but also made full use of its high-quality printing capabilities," he said.

"In fact, rather than spending \$10,000 on typesetting, pasteup and camera reduction, we were able to use the Diablo 1620 to completely prepare the camera-ready copy from which *The Inside Source* was printed — some 500 pages of material."

The Hyterm is a microprocessor-driven data communications terminal that uses the Diablo Hytype II serial printer. The terminal features a variety of interchangeable daisy print wheels in different type fonts and is capable of letter-quality printing output at 45 char./sec.

"The Hyterm kept our total publishing cost for a first run of 1,000 copies of *The Inside Source* down to \$14,000," Spence said. "By avoiding costly and time-consuming typesetting charges, we estimate that we saved roughly \$6,500. Probably more important, in terms of cost, was the amount of man-hours and clerical expense saved by using the terminal to prepare personalized letters necessary both in the compilation and marketing stages of the project."

Working evenings and weekends for a year and a half, Spence, Adams and deLucca combed libraries and sent out more than 600 letters, printed on the terminal, to po-

(Continued on Page S/21)

DECwriter!

\$2395*

A Perkin-Elmer editing CRT with
line drawing and a 100 cps thermal page printer.

You can also plug the Pussycat Printer into our Owl-1200 Terminal and have a powerful editing terminal with forms drawing capabilities and hard copy, too.

Draw forms or bar charts on the Owl, then print them on the Pussycat. The Pussycat even prints inverse video fields for highlighting charts.

The Owl and The Pussycat. Another great CRT thermal printer combo from Perkin-Elmer.

Call (800) 631-2154, toll free, to order your Pussycat and CRT.

For more information, write Terminals Division, Route 10 and Emery Avenue, Randolph, New Jersey 07734, or telephone toll-free (800) 631-2154.



PERKIN-ELMER

Data Systems

Helping people succeed with computers.

BLIS/COBOL
MULTIUSER OPERATING SYSTEM

makes your DG
NOVA/ECLIPSE
BLISsful

For information call today...
IPI
Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando, Florida 32789)

'Very Rarely' Go Down Disk Replacements Please Programming Firm

By Howard A. Karten
CW Staff

NEW YORK — How do you attach a 3330 disk to your IBM 360 when IBM doesn't supply the necessary software? Mike Parrella, president of Decision Strategy Services Corp. (DSS) here, turned to IteI Corp. to do the job and, after using the IteI 3330 replacement for 18 months, is pleased with the result.

Parrella's company does contract programming for other businesses, concentrating exclusively on on-line applications. In addition, the firm operates a 370/145 which runs several on-line systems for clients. The applications on the system include order en-

try, accounts receivable, data collection and data query.

Best Deal

When Parrella acquired his 360/50, he wanted to run 3330 disks with it. In addition, he knew he would eventually be converting to a 370. "I looked at IteI and other vendors, and IteI's cost and abilities seemed most competitive," Parrella said. "I had heard many good things about IteI hardware and software, and I wasn't disappointed."

Discussing the performance of the IteI disks, Parrella commented that he had some minor problems with the disk control unit at first, "... but once [IteI] got it straightened out, the units

performed very well. It's very rare for a disk to go down now."

He also feels IteI support is excellent. "They respond immediately when I put in a call," he said.

DSS specializes in developing on-line systems for clients and pays for its 370 by running some of these on that system. Most of these applications run under a software package developed by DSS called Terminal Applications Processing System, or Taps.

The company's equipment complement presently includes the 145 with 256K bytes of IBM memory and 768K bytes of IteI memory, IteI 3420-compatible tapes, two 1403 printers, an IBM 2540 card reader and

a Memorex Corp. 1270, which emulates an IBM 2701. The company runs Release 34 of DOS/VS, using a 3270 as a console.

The equipment presently operates 24 hours a day, seven days a week, and runs five partitions. Parrella is planning to increase this to seven in the near future.

DSS is pleased enough with IteI's performance to be considering installing an IteI AS/4 to replace its 145. "We're practically an IteI shop now," Parrella notes.

Parrella spoke enthusiastically about IteI's service. "I'm a very small guy, relative to the rest of the world, and when I have a problem, the IteI people are all over me. They follow my business, and as it grows they offer migration paths and suggestions to increase my machine capabilities."

"My salesman always keeps an eye on me to make sure my equipment meets my business needs. IteI is much more receptive than most other companies as far as the little guy goes."

Plotter Speeds Job Turnaround For Builders

(Continued from Page S/7)

that would be very difficult for an engineer to do.

"Traditionally, a truss design took several weeks and involved a number of people so there was a greater opportunity for error. A salesman would go to the construction site, take down the job specifications and mail them to the truss designer," Naurison explained. "Then an engineer would design the roof or floor truss using code books and calculators. The finished drawings and specifications would be returned to the builder weeks later."

No On-Site Visits

With the computer-based system, the on-site visit is eliminated and engineering and drafting can be done in minutes. In addition, much of the time-consuming research is avoided since the computer has most of the information stored in memory. "Our engineers simply feed in certain criteria and the computer analyzes the available data to arrive at an answer," Naurison said.

In addition, the system has provided cost benefits for customers. "We are able to determine the most efficient and economical use of materials, thus eliminating waste," he stated. "And the speed with which we can do the drawings and the volume of designs we handle, together with the lower costs for our truss plates (manufactured in large quantities) mean major savings for our customers."

Naurison believes that many of his customers are persuaded to do business with him because of the plotter itself. "When a prospective customer comes in, the first thing I show him is our plotter. These people are professional, and they're astounded when they see that machine operating. I've never seen a prospect come in here who hasn't been sold once he's seen the plotter."

Fastest track for running executives.

**Moore Speedread® Saves Executive
Time And Reduces Computer Costs.**

You run a fast track and so do your other key executives. That's why you'll appreciate faster-reading computer reports on Speedread. Our exclusive Eye Track® color bars let you scan accurately across columns in a fraction of a second. And Moore Clean Print® carbonless paper saves reading time because the printout is sharper and clearer on each copy. The data capacity of our 8½ inch page equals an ordinary 11 inch page, so it's easier to use and file.

You'll save up to 37% in storage space and reduce shipping costs with carbonless Speedread's smaller size. You'll also eliminate costs of carbon paper handling and disposal and reduced forms loading frequency.

Get on the fastest track with Speedread. Get proof. Send for a Speedread sample pack today.



MOORE BUSINESS FORMS, INC. 1205 N. Milwaukee Ave., Glenview IL 60025 312/297-1300

With the Kodak laser printer, film is cheaper than paper.

Consider the operating cost of the Kodak laser printer versus the operating cost of a paper-impact printer.

Consider, for example, the cost of generating a 1000-page, 3-copy report.

Three-part stock paper costs about \$22.30* per 1000 pages. But you can put the same report on microfiche for around \$1.50.

So, from the standpoint of materials alone, paper is about 15 times more expensive than microfilm.

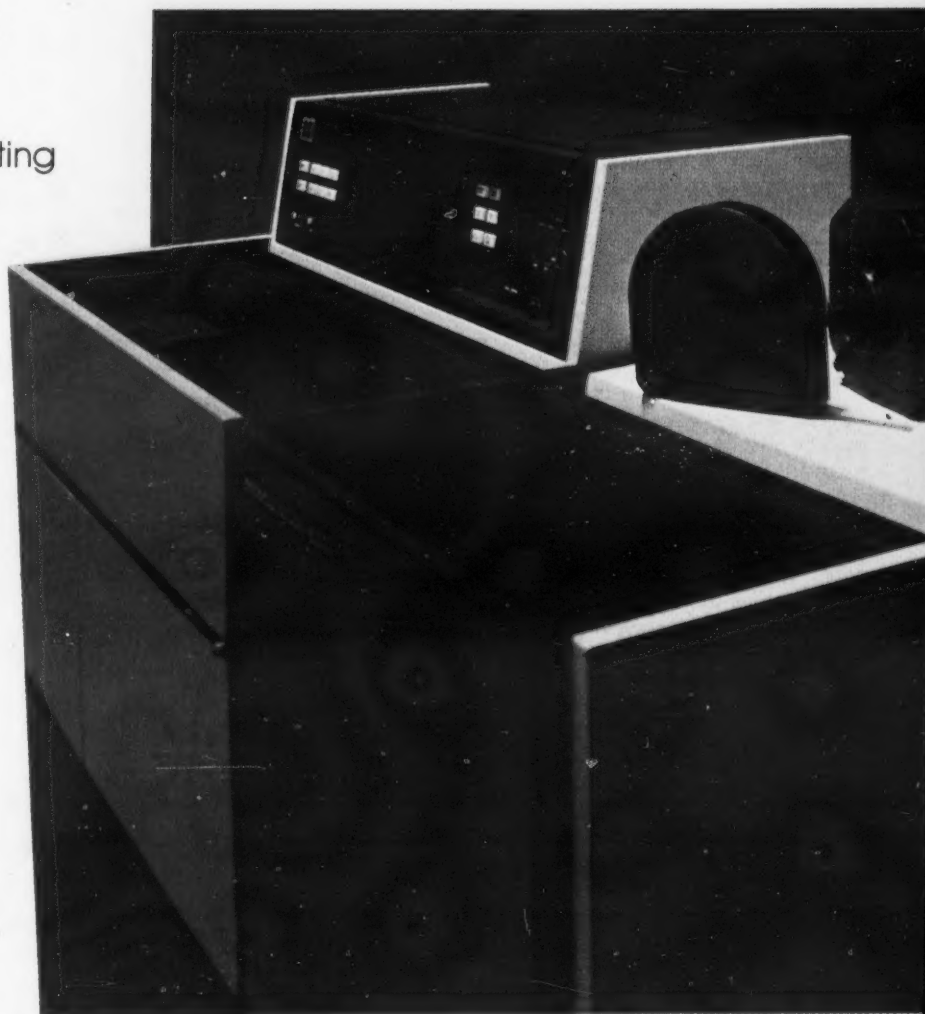
Time and labor costs are important factors, too. Especially in a DP department. Which is why you should know that it would take almost 50 minutes to decollate, burst, bind and package a 1000-page report. It would take only 9 minutes to print, duplicate and package the same report on just 4 microfiche.

A Kodak laser printer can save you money in other ways, too. With a paper printer, you'd have to load at least 12 boxes of paper to print the equivalent of one cartridge of 16-mm film. Compared with fiche, the margin of difference is even wider. You'd need 31 boxes of paper to print the equivalent of one fiche cartridge.

In fact, when you add up the savings in materials and labor, you'll find that printing with a Kodak Komstar laser printer is about 87% cheaper overall than printing with a paper-impact printer.

Call your Kodak representative today for a demonstration of the Kodak Komstar 100, 200 or 300 microimage processors. But hurry. Every day you wait is costing you money.

Eastman Kodak Company, Business Systems Markets Division, Dept. DP8591, Rochester, NY 14650.



87% cheaper.



**Kodak Komstar microimage processors.
The printers that print without paper.**

*Prices vary with geographic location and grade of paper purchased.

Independent Peripherals: Cost Not Only Factor

(Continued from Page S/14) through extended lengths of cables.

For this reason, IBM requires contiguous portions of floor space for all components in its direct-access storage facility (DASF) disk systems. Some independents don't follow IBM's policy in this regard because its cabling restrictions also prevent customers from using the various nooks and crannies that might otherwise be filled with an individual drive module or a controller.

Special operating and maintenance hardware features should also be considered by the user. Does the equipment include both operator and maintenance panels? Where are they located? What special switches and indicator lights are provided to aid the user in operating the system and the customer engineers in maintaining it?

By definition, plug-compatible replacements should be the logical equivalents of their original counterparts. Still, it's a good idea to check whether there will be a need to modify existing hardware or software before installing and operating the equipment.

For instance, some dual-density packs can organize data somewhat differently from single-density packs; minor software modifications may therefore be required.

Also, some dual-density disks require modifications to the IBM OS and DOS operating systems and others necessitate careful data organization to prevent performance degradation. Generally, the vendor is responsible for any required system modifications.

Independents offer a wide range of performance characteristics related to the disk drive's mechanical motion. Differences are generally found in such features as moving-head repositioning time, effective data transfer rate and disk start/stop time.

Whether these performance variations will impact a user's operation depends on the system type and level of activity. For example, if the installation is operating at full capacity, then increased data transfer rates can improve system throughput.

Although the same bit density and rotational speeds give the same peak transfer rate, reduced access times result in more data actually transferred to the CPU in a given time period. Start/stop times can become significant for installations where disk packs are frequently changed.

If a substantial amount of disk usage involves random file access applications, drives with shorter moving-head repositioning times can handle files more efficiently.

Most plug-compatible manufacturers offer a variety of pricing arrangements. The optimum price can vary, but it reflects a balanced mixture of lease duration, maintenance and overtime terms and cost.

Short-Term Leases

Short-term leases benefit users who decide to cancel in favor of more technologically advanced or less expensive equipment, because there is no

penalty. Short-term leases can also be advantageous for users who want to operate a plug-compatible vendor's equipment on a trial basis.

On the other hand, short-term leases are usually more expensive, and the user is subject to more frequent price changes if he renews his lease during each short-term interval.

Long-term leases involve

small monthly payments but extended commitments on the part of the user. The user is protected against price increases, but also prevented from taking advantage of any price decreases.

Maintenance is usually included in the lease price, but maintenance hours vary and the price changes accordingly. The customer generally pays higher maintenance fees for service outside the normal

five-day, 40-hour working week and, unfortunately, the normal working week is "prime time" for most computer installations.

This results in a trade-off decision: Should the user pay for on-call maintenance during hours that won't interrupt the installation's activity, or should the user pay a smaller maintenance fee and risk system downtime during the most productive hours?

Announcing The 150-cps terminal

**It impacts your workload.
Not your wallet.**

Meet the newest member of our OMNI 800* family: the Model 820 KSR Impact Terminal. It has all the features, functions and options of costly multi-copy terminal printers. But not the price tag.

The 820 comes with standard equipment that's setting new industry standards. So, join us for a short

demonstration and we'll show you what we mean.

An operator's dream.

First of all, you'll note that the new 820 has an efficient, compact design with a keyboard resembling that of a standard typewriter. So, it can sit on a desk top or stand. And it's easy to use. In operation, you'll see one of the first features: a 9 x 7 dot

matrix printhead that prints clear, legible characters. On both the original and up to five copies, too. And a wide carriage that prints forms from 3 to 15 inches in width — up to 132 characters across — at 150-cps speed.

Now, notice the 640-character FIFO buffer. It channels data so



Despite Variety of Devices Ultimate Hard Copy Solution Not Yet Offered

By Tim Scannell
CW Staff

BOSTON — Although there are a variety of digital hard-copy devices available to the user — electrostatic, thermal, ink-jet, xerographic, film and conventional impact printers and pen plotters, none appear to be the ultimate solution for all applications, according to Alan Dawes, a representative

of the Versatec Co.

"In order to satisfy the varied needs for hard-copy devices, two techniques have been developed," Dawes said at a recent conference here. The first is "a concept of image dissection" and the second is "the writing technique itself, of which there are several."

Image dissection, Dawes ex-

plained, is the process used by both nonimpact and some impact devices to achieve a "versatility of display. The image to be displayed, such as letters or graphics, is dissected into a number of common elements" called dots.

These dots are selectively positioned "in a fashion similar to a television display, where the scanning beam is turned

on and off, producing the desired image when the eye integrates the detail," Dawes said.

Resolution, although previously a problem with earlier devices, now "approaches the look of a typewritten page" with displays as dense as 200- to 300 dot/in., Dawes added.

In the area of writing techniques, one particular process — electrostatic writing — is be-

lieved to hold "extraordinary promise" because of its inherent simplicity, Dawes said.

Electrostatic writing devices employ a conductive paper coated with a dielectric film a few microns thick. "Its major function is to retain an electric charge," Dawes explained.

The paper is passed between a conductive stylus and an electrode that charges the surface of the paper. Then, "using a recording head which contains an array of embedded nibs, and addressing those nibs in the appropriate manner, one can selectively deposit charged dots on the surface of the dielectrically coated paper," he said.

The electrostatic disturbance remains invisible until toner, a developing solution composed of a suspension of carbon particles, is applied to the paper's surface. "The black (carbon) particles migrate to the charged areas, where they are deposited and permanently fixed as the paper dries," Dawes said.

The advantage of using electrostatic-type printers or plotters over devices that employ another printing technique is that these machines, because of their method of image dissection, can display any kind of graphic and alphanumeric information.

"This has become very useful where different languages have to be written by the same machine and where dense black areas, plus fine-line graphics, are required," Dawes pointed out.

Thermal printers also use treated paper, but their resolution is usually limited to less than 100 dot/in. "Total versatility of display is possible by exploiting image dissection and imaging with one writing element," Dawes said.

Because the heads of the printer can be positioned across the page, this type of machine is ideal for use as a "low-cost, 100 char./sec serial printer."

Ink-Jet Printing

"The most important benefit of ink-jet types of printing devices is their ability to write on any substrate — from letterhead bond to carpets," although "reliability at a reasonable cost has yet to be proven," Dawes stated.

Synchronous systems print characters by "selecting ink droplets from a continuous stream" at about 100,000 droplet/sec, but asynchronous machines are considerably slower (approximately 20,000 droplet/sec) because the imaging is produced by a "drops-on-demand" system.

High speeds are possible with multiple ink-jet heads, (Continued on Page 5/21)

the 820 KSR. with more impact.

it's printed at maximum efficiency, either uni-directionally or bi-directionally. And the buffer provides overflow protection so you won't lose any input.

Status symbols.

Left of the keyboard you'll notice a three-digit L.E.D. Terminal Status Control panel. But it won't confuse you. It shows you the printer's next position. Or the terminal's status. Or an appropriate code when you have an error condition. It eliminates all the guesswork.

You'll also see Answerback Memory, on our Model 820 KSR. Plus a view mode that lets you check on the last character printed.

More impact with our printhead.

Also, there's the wire matrix assembly-designed printhead. It's specifically designed to increase printing life to 150-million character impressions. And our new extra-length ribbon allows the printhead to make more strikes per ribbon.

Maintenance in minutes.

To simplify maintenance, we've reduced the number of basic components to just four: the motherboard/microprocessor, the keyboard, the print/drive mechanism and the housing. The majority of which can be replaced in minutes.

Making the most of your options.

To increase its performance even further, the 820 is available with optional compressed character font, ASCII/APL keyboard, an 18-key numeric cluster, and a powerful device/forms control package.

Far-reaching support.

Every OMNI 800 Model 820 Impact Terminal comes with TI's over 30 years of experience in the electronics industry. Plus the technical expertise and support of our worldwide organization of factory-trained sales and service engineers, and

TI-CARE†, our nationwide automated service dispatching and field service management information system.

To see how much more impact our new impact terminal can have on your workload, call the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001, or phone (713) 491-5115, extension 2124.



Yes! I am interested in the Model 820 KSR Impact Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Address _____ City _____

State _____ Zip _____ Phone _____

Mail to:

TEXAS INSTRUMENTS
INCORPORATED

P.O. Box 1444, M/S 784, Houston, Texas 77001

OMNI 800
electronic data terminals

*Trademark of Texas Instruments

†Service Mark of Texas Instruments
Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

We put computing within everyone's reach.

Based on Label Preparation System Printer Allows Flexibility in Traveler Badges

Special to CW
DAYTON, Ohio — Name badges are a small but important ingredient of travel incentive programs various companies offer their employees.

A firm here, recognizing the need for a viable yet economi-

The E.F. MacDonald Co. administers incentive programs for more than 3,000 companies throughout the country. This involves making all the necessary arrangements and providing the materials for more than 250,000 people who have received travel as a reward for outstanding achievements in selling, production and other areas, a spokesman said. Unfortunately, the name badge has been a "nagging headache" for the firm.

Typewriter Limitations

First of all, the company was limited to what a typewriter could do — print in one type size that was usually too small for the badge's purpose. At the same time, company officials were looking for a badge that would adhere to any fabric without doing damage and that would last a reasonable length of time, the spokesman stated.

In most cases, the company prepared six badges for each person participating in an incentive travel program. The badges formerly came on sheets and were imprinted with colorful information

identifying the company and the trip's locale. A typist produced the badges by typing information on a master typewriter while a slave typewriter would generate five more automatically.

Several Production Steps

The computerized badge printing operation, however, is actually composed of several production steps which begin when a customer sends in a list of people scheduled to take a trip.

The lists of people are first keypunched, processed by an IBM 370/145 and input to a data base containing all the necessary information about the trip and the trip's destination. This information consists of a list of functions to attend, currency data, information about passports (if needed) and so on, as well as the details needed to produce the name badges, the spokesman continued.

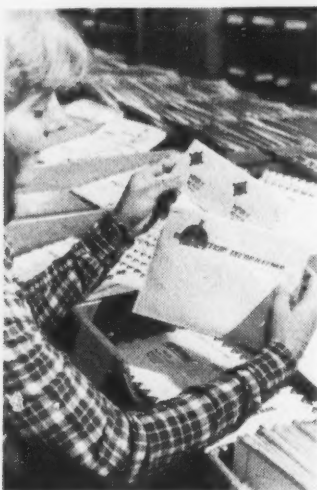
The complete "pretrip" information is then accessed from the data base, along with the individual's personal data, and output to magnetic tape. The tape is then used, the spokesman said, to prepare a deck of cards — one for each person on the trip list. The punched cards serve as the source for the LPS name badge printing operation.

Card Reader

The deck of cards is placed in a 200 card/min reader, which transfers the information to a Standard Register badge printer. The printer is loaded with one-part continuous forms consisting of blank

labels mounted three-wide on a carrier sheet, the firm noted. When only one badge per name is required, the company uses a one-wide format, al-

styles consisting of name, home city and state and other variable items which can be entered on the first three lines. The last line, if used, is for



Badges are included in each traveler's information packet.

cal means of individual identification, developed a computerized name badge printing system based on a label preparation system (LPS) offered by the Standard Register Co.



Card reader (at top) feeds information from tab cards to printer, which produces pressure-sensitive labels on continuous forms.

though this is infrequent, the spokesman added.

The system is not only fast but it provides a great deal of flexibility in imprinting badges, the spokesman stated. The system has, for example, two basic formats, each having four lines of type. The difference is that the first line of one format has .4-in. type and on the second format the first line is .2 in.

Within the two formats, there are also six location

an item that is constant, such as a short phrase describing the trip's theme.

In addition to the type size variety and layout style, the spokesman said, the system also allows the inclusion of nicknames, if desired. This was not possible with the typewriter operation.

After the badges are imprinted with the information, the continuous form is separated into sheets and sent out to have decorative material such as company logo and name, trip location and so on, imprinted on each one, the spokesman pointed out.

While cost was not the determining factor in the company's decision to change procedures, it has realized savings, the spokesman claimed. More importantly, the readability problem has been solved for all concerned.

TELETYPE MUFFLER

Reduce the sound level of your TELETYPE model 33 by installing the Silencer DB-33 Kit. Only takes a few minutes and you need no special tools.

□ KSR — \$14.95 □ ASR — \$15.95

Calif. res. add 6% sales tax

DATASET, Dept. 3B

P.O. BOX 312, Tujunga, CA 91042

*Registered
Trademark of
Teletype Corp.

1403N-1 SPEED AT 20% OF COST!

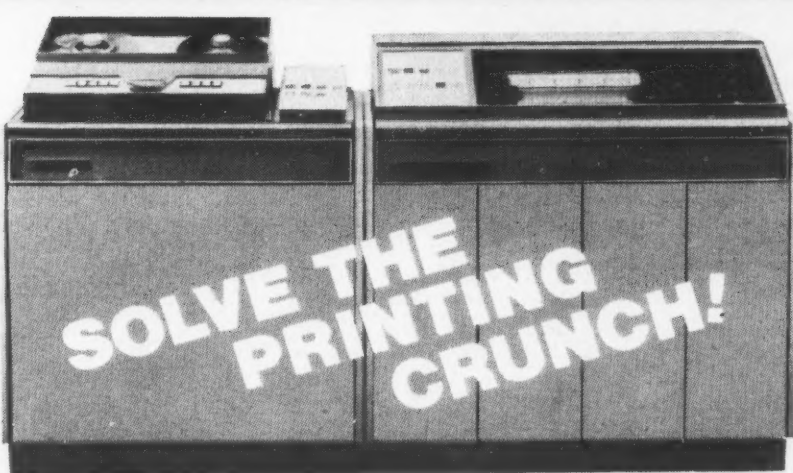
IDEAL FOR:

- ★ LARGE SCALE LABELING & DIRECT MAIL OPERATIONS
- ★ HIGH VOLUME PRINTING OF STOCK ACCOUNTING & INVENTORY REPORTS

ONLY \$9500

A COMPLETE FACTORY-REFURBISHED DATAPRODUCTS 4000 OFF-LINE PRINTER SYSTEM.

- 7 OR 9 TRACK TAPE
- 115VAC, 9000W PEAK
- 48 CHARACTER FONT
- EASY PAPER LOADING
- 132 CHAR/LINE
- AUTO PARITY RETRY
- VACUUM COLUMN TAPE BUFFERS
- 6/8 LINES PER INCH VERTICALLY
- SORBUS MAINTENANCE
- READY TO SHIP



PAYS FOR ITSELF IN JUST A FEW MONTHS!

AMERICAN USED COMPUTER • 617-261-1100

P.O. BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215



'I Hate to Bring This Up, Brewster, But Your Programming Is Getting More and More Autobiographical.'

Mini, Printer Help Grad Move Into Publishing

(Continued from Page 5/15) tential information sources throughout the country. Once they had gathered their data, the fed it into the computer system for processing, indexing and cross-referencing. The collated bibliographical entries were printed out on the terminal and the printout sent to an outside print shop for produc-

tion and binding of the book.

Marketing Aid

As part of its marketing effort, Quad also used the terminal/printer to produce more than 500 press releases and personalized cover letters to announce the publication of its book. According to Spence, "Because the Hyterm can han-

dle up to 12 different forms lengths, we were also able to save a lot of time and trouble by storing our mailing lists on the computer system, then writing a simple program to print out the appropriate envelopes on the terminal.

"In one weekend, we printed more than 300 cover letters and envelopes. And the print

quality was so good that each one looked as if it had been individually typed by a secretary," he said.

Since the book's publication in late 1977, Quad has distributed more than 600 of the original 1,000 copies produced. "If there is a continuing demand," Spence explained, "we are confident of being able to bring out subsequent, annually updated versions of the bibliography... utilizing the printer and the minicomputer."

Quad International, which began as a graduate school research project, is currently undertaking a new task — a ma-

jor readership demographic study for a leading national magazine.

"We'll be surveying more than 35,000 individuals scattered around the country. "Quad is designing the computer data base and software systems to handle the questionnaires and to process the responses to them into coherent, useful media market profiles," Spence explained.

"Again, the terminal/printer will be used to prepare all our forms for mailing and to print out the ultimate report. And for a \$3,500 investment in hardware, Quad is getting an awful lot," he said.

Specifics Needed for COM

(Continued from Page 5/12) personnel can help limit excess material and if that is not possible, certain software will permit multiple reports to be placed on a single fiche.

Compare Economics

In order to satisfy the main objective of cutting costs, project leaders should compare all the economics of their old system and the proposed microfiche system. An application worksheet that incorporates not only paper, but print time, storage and paper handling costs is a necessity if the complete cost picture is to be seen, Ocon stated.

After selecting the appropriate applications, users should select the right microform, choose proper reduction ratios, decide on indexing needs, develop a conversion timeta-

ble and, of course, train users.

There is little question that microfiche, as opposed to 16mm and 35mm film, is best suited for DP reports because of its ability to be retrieved quickly, its reasonably small size and the possibilities for visible indexing, Ocon observed.

In the area of reduction ratios, the higher the better, Ocon said. While 24X fiche contains 80 pages of data, a 72X reduction permits up to 690 pages of data plus indexing to be stored on a single 4-in. by 6-in. piece of film.

Explore Software

Software that offers indexing flexibility and thereby enhances the use of the applications and increases efficiency should be carefully explored, Ocon noted. Eye-readable in-

dexes should only use enough characters to permit fiche and column selection, and report titles should be meaningful to everyone in the corporation — not just the DP department.

Conversion schedules should be specified in advance and followed, Ocon declared. All too often, he stated, a few applications are converted and then the conversion schedule begins to slip. This results in wasted effort and, more important, wasted time, he emphasized.

Finally, a great deal of emphasis should be placed on user training. Without proper training, Ocon explained, all the time spent looking at applications and collecting data is lost if a clerk does not know how to use the film or where to store it.

Ultimate Solution Not Yet Offered

(Continued from Page 5/19) although such devices "are expensive and of uncertain reliability," Dawes said. However, ink-jet systems can produce color characters and continuous tone images by modulat-

ing the droplet size.

Electrophotographic systems dissect the images and reconstruct them in a digital dot matrix form, Dawes said. These machines "have the potential to merge graphics with text

... and their graphics capability is oriented toward forms creation and special characters.

"Conceptually," these types of printers "could reproduce highly versatile graphics," he added.

Photoplotter's Benefits

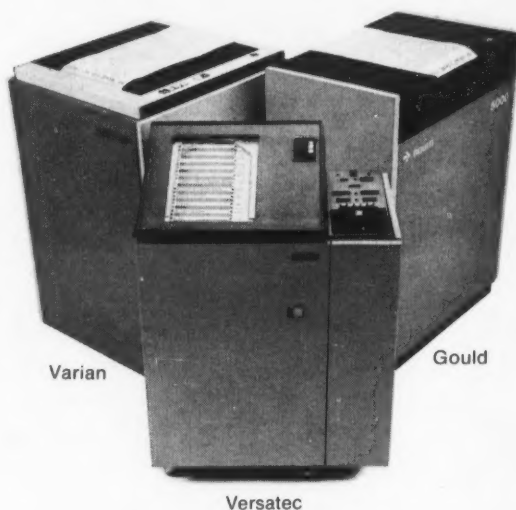
Photoplotters, which utilize film, tend to be expensive and serve specialized applications such as data logging and seismic plotting. "Their advantage is speed and an ability to create variable-width, dense black areas," Dawes said. "Film is also used extensively for capturing digital images from CRT displays."

Impact printers "offer a means to create plots for the occasional graphics user unable to justify the cost of a plotting system," Dawes said. "Many simple business graphs, bar charts, scatter diagrams and so on can be produced on low-speed daisy-wheel printers."

Finally, pen plotters, although very slow, "are highly accurate and can write on a variety of substrates."

In the long run, the machines that will be most accepted by users will be those that are simple to operate and "most versatile in rendering information visible," Dawes observed.

If you own one of these



get sensitive.

You pay plenty for electrostatic paper. You should know about our new paper that makes brighter images and costs less. Try a roll free. Come with the Sensitive Paper People.

GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

sensitivity coupon

Send one free roll or fanfold to fit:

☐ Gould, ☐ Varian, ☐ Versatec

Annual Usage: _____ rolls Paper Number _____

Name _____ Phone _____

Firm _____

Address _____

City _____ State _____ Zip _____

Mail to Coated Products Division, Graphic Controls Corporation, P.O. Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7978.
(In New York State, call 716-847-7500.)

CW-E-6

charge!

Get off the routing list and on to the subscriber list. Just take out your American Express, Master Charge or Visa card, find the subscription form bound into this issue, and CHARGE!



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

**If you're good,
Boeing wants you to work
in Seattle and hike and
fish and ski and sail and
enjoy the Pacific Northwest.
Now.**

Discover skiing just 90 minutes
from Seattle. Hike in the forest from
the back of a Boeing 747. And
enjoy the finest commercial and
services to The Boeing Company
and a variety of commercial and

Discover skiing just 90 minutes from work. Hike in abundant forests, catch a salmon, or set sail for scenic islands over the weekend.

You won't find a better opportunity to live in the Northwest than to work for Boeing Computer Services.

BCS provides local and remote computing, custom programming, application packages, training and consulting

services to The Boeing Company and a variety of commercial and
nt customers.

We're hiring people for the Seattle area right now, so if you're good, we'd like to hear from you.

Mail your résumé
to Boeing Computer
Services, P.O. Box
3707-JQV, Seattle, WA
98124.

An equal opportunity employer.

LYST

RAM and 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072, 262144, 524288, 1048576, 2097152, 4194304, 8388608, 16777216, 33554432, 67108864, 134217728, 268435456, 536870912, 1073741824, 2147483648, 4294967296, 8589934592, 17179869184, 34359738368, 68719476736, 137438953472, 274877906944, 549755813888, 1099511627776, 2199023255552, 4398046511104, 8796093022208, 17592186044416, 35184372088832, 70368744177664, 140737488355328, 281474976710656, 562949953421312, 1125899906842624, 2251799813685248, 4503599627370496, 9007199254740992, 18014398509481984, 36028797018963968, 72057594037927936, 144115188075855872, 288230376151711744, 576460752303423488, 1152921504606846976, 2305843009213693952, 4611686018427387904, 9223372036854775808, 18446744073709551616, 36893488147419103232, 73786976294838206464, 147573952589676412928, 295147905179352825856, 590295810358705651712, 1180591620717411303424, 2361183241434822606848, 4722366482869645213696, 9444732965739290427392, 18889465931478580854784, 37778931862957161709568, 75557863725914323419136, 151115727451828646838272, 302231454903657293676544, 604462909807314587353088, 1208925819614629174706176, 2417851639229258349412352, 4835703278458516698824704, 9671406556917033397649408, 19342813113834066795298816, 38685626227668133590597632, 77371252455336267181195264, 154742504910672534362390528, 309485009821345068724781056, 618970019642690137449562112, 1237940039285380274899124224, 2475880078570760549798248448, 4951760157141521099596496896, 9903520314283042199192993792, 19807040628566084398385987584, 39614081257132168796771975168, 79228162514264337593543950336, 158456325028528675187087900672, 316912650057057350374175801344, 633825300114114700748351602688, 1267650600228229401496703205376, 2535301200456458802993406410752, 5070602400912917605986812821504, 10141204801825835211973625643008, 20282409603651670423947251286016, 40564819207303340847894502572032, 81129638414606681695789005144064, 162259276829213363391578010288128, 324518553658426726783156020576256, 649037107316853453566312041152512, 1298074214633706907132624082305024, 2596148429267413814265248164610048, 5192296858534827628530496329220096, 10384593717069655257060992658440192, 20769187434139310514121985316880384, 41538374868278621028243970633760768, 83076749736557242056487941267521536, 166153499473114484112975882535043072, 332306998946228968225951765070086144, 664613997892457936451903530140172288, 1329227995784915872903807060280344576, 2658455991569831745807614120560689152, 5316911983139663491615228241121378304, 10633823966279326983230456482242756608, 21267647932558653966460912964485513216, 42535295865117307932921825928971026432, 85070591730234615865843651857942052864, 170141183460469231731687303715884105728, 340282366920938463463374607431768211456, 680564733841876926926749214863536422912, 1361129467683753853853498429727072845824, 2722258935367507707706996859454145691648, 5444517870735015415413993718908291383296, 10889035741470030830827987437816582766592, 21778071482940061661655974875633165533184, 43556142965880123323311949751266331066368, 87112285931760246646623899502532662132736, 174224571863520493293247799005065324265472, 348449143727040986586495598010130648530944, 696898287454081973172991196020261297061888, 1393796574908163946345982392040522594123776, 2787593149816327892691964784081045188247552, 5575186299632655785383929568162090376495104, 11150372599265311570767859136324180752990208, 22300745198530623141535718272648361505980416, 44601490397061246283071436545296723011960832, 89202980794122492566142873090593446023921664, 178405961588244985132285746181186892047843328, 356811923176489970264571492362373784095686656, 713623846352979940529142984724747568191373312, 1427247692705959881058285969449495136382746624, 2854495385411919762116571938898990272765493248, 5708990770823839524233143877797980545530986496, 11417981541647679048466287755595961091061972992, 22835963083295358096932575511191922182123945984, 45671926166590716193865151022383844364247891968, 91343852333181

No Agreement on Definition

No Real DDP Systems Seen Being Sold

By Howard Karten
CW Staff

ANAHEIM, Calif. — No vendor is presently selling true distributed data processing (DDP) hardware and software.

That is one of the startling conclusions reached by a group of panelists at the recent National Computer Conference here.

Defining DDP as "a collection of processing elements, interconnected both logically and physically with decentralized, systemwide control of resources for cooperative execution of application programs," Dick Eckhouse of Digital Equipment Corp.'s Research and Development Group said he sees four key answers to the question "Why DDP?": reliability, extendability, conformability/adaptability and applications performance.

In his jocular presentation, Eckhouse discussed several concepts and pieces of hard-

ware which he said are "not DDP." Among these, he said, are multiprocessing, computer networking, intelligent terminals and satellite processors.

There is little or no agreement on the meaning of DDP, he added, but there are nevertheless some key DDP questions to be asked. Among these are how the data is distributed and how error handling is performed.

An additional, important issue, he said, is the question of "how we can use the inaccurate or missing information to perform optimal resource allocation." This question, in turn, points to some research directions in DDP, such as synchronization, availability and load balancing.

Drawing a distinction between the uses of data processing in the past and in the future, David J. Farber, professor of electrical engineering at the University of Delaware and

chairman of the panel, said, "The older notion of economies of scale of larger systems is just not a factor of modern economic life" with computers.

"In the 1950s and '60s, with centralized DP operations, the organizations had to adapt to the needs of the computer, which produced a great strain in organizations. Distributed systems put power back in the hands of those who need and use it," Farber said.

Although this view seemed to be somewhat conjectural, given the agreement among panelists that no true DDP hardware is currently being sold, Farber nevertheless went on to caution that much higher reliability and availability of equipment is needed than currently exists before DDP can be embraced as a panacea.

Cautioning attendees that technological issues are merely one aspect of distributed systems, Farber suggested that social impact statements on such systems be required before they are installed, as environmental impact statements are now required for construction projects.

Adding to the heavily academic flavor of the panel, E. Douglas Jensen of the Honeywell Systems and Research Center of Minneapolis said he knows of "no publicly announced software" that meets his definition of a distributed system — that is, a system in which the software as well as the hardware is distributed.

Seven-Color Xerographic Printer Works on Both Originals, Input

NEW YORK — A color xerographic printer capable of producing graphics from either original material or digital input has been introduced by Xerox Corp.

The Xerox 6500 can reproduce material in seven colors at a rate of 192 document/hour, company officials said.

Presently only one device — the Ramtek Corp. Model 6200A terminal — is capable of being interfaced to the 6500, the Xerox spokesman said, but Ramtek is currently working on interfaces for its other color graphics terminals.

Two other vendors, Aydin Corp. of Ft. Washington, Pa., and Chromatics Corp. of Atlanta, Ga., are also developing interfaces, they added.

Company officials said many companies had expressed interest at the recent National Computer Conference in interfacing the 6500 directly to a mainframe, but they know of no one actually planning to produce such an interface. The unit is clearly intended to compete in some fashion with the color plotters now available, however, since it is said to be TTL- or DTL-compatible, with synchronous operation of 400 scan/sec and an image resolution of 100 point/in.

The colors available with the unit — cyan, magenta, yellow, red, green, blue and black — can be printed on either plain bond paper or suitable transparency material using a laser-recording process on a raster-type image, one spokeswoman said. The maximum dimensions for conventional photocopy are 8.5- by 13.75 in., she added, while maxi-

mum dimensions for digital input are 6.4- by 13.75 in.

The printer is priced at \$25,000, with first deliveries scheduled for August. No leasing plans will be offered, Xerox said from 280 Park Ave., New York, N.Y. 10017.

Voice Synthesis System Updated

TROY, Mich. — The Votrax Division of Federal Screw Works is offering an updated version of its Model VS-6 vocal synthesis system that reportedly features improved voice quality.

The Votrax VS-6.4 has a first-in/first-out (Fifo) buffer and comes with either a serial or a parallel interface, according to a spokesman. It interfaces with any computer, requiring a speed of 300 bit/sec in Ascii (with serial interface) or 150 bit/sec (parallel) to generate continuous-sounding speech.

The system produces human-sounding speech by combining phonemes, which are used as the basic elements of speech. The phonemes, combined in response to digital information presented to the unit, are integrated with inflections to produce an unlimited vocabulary, the spokesman explained.

The Votrax VS-6.4, which meets RS-232 standards, sells for \$5,955. Users of VS-6 can upgrade to a VS-6.4 for \$1,500, the company said from 500 Stephenson Highway, Troy, Mich. 48084.

Printer Runs at 900 Line/Min

MALDEN, Mass. — Data Printer Corp. has introduced a 900 line/min printer featuring 8080A microprocessor control and single-line memory buffering.

The Model 1290 has 132 print positions with 10 position/in., a paper slew rate of 20 in./sec and motorized tractor control for forms handling, according to a spokesman. A vacuum cleaner system, paper puller system and electronic vertical format unit are

available as options.

Vertical forms control for the unit is 8-channel, with 1 in. paper tape, and includes automatic single- or double-line spacing. Line feed of 0 to 63 lines under program control is also standard.

The Model 1290, which uses the company's Chaintran method of printing, is available for \$13,700 from Data Printer at 59 Middlesex St., Malden, Mass. 02148.

mti
159 Northern Boulevard
Great Neck, N.Y. 11021

TERMINALS
LEASE • RENT • PURCHASE

MTI's got them all... including a complete line of accessories... all at the lowest prices with quick delivery!

For a Quick Response —
Call TOLL FREE
800-645-8016 NOW!

In New York Call
516-482-3500 or 212-895-7177
Ask for Bert or Lenny

Save Time & Money

COME TO ONE SOURCE FOR THE
BEST BUYS IN COMPUTER PERIPHERALS

digital  DEC writers • LA35/36	digital  • LS120 Teleprinter	Si LEAR SIEGLER  • ADM 1 and ADM2 Smart Terminals • ADM3 Dumb Terminal	digital  DEC Scopes • VT50 • VT52
Diablo  Hyterm	NEC  Bell 103A Interface • RS-232-C Interface	OMNITEC  Digital Cassettes Couplers & Modems	intel  Micro Computer Systems



“SWITCHING TO DATA GENERAL IS THE BEST THING THAT COULD HAPPEN TO AN OEM.”

Hal Tilbury, the President of Compusource of El Segundo, California, one of the largest commercial OEMs west of the Mississippi, feels that Data General gives him much better support than his previous minicomputer supplier. Compusource has sold over 40 systems in one and a half years with Data General. Tilbury knows what it's like to have the kind of back up support that even supplies him with important sales leads.

Tilbury likes the Data General software compatibility — from small NOVA systems to the large ECLIPSE — because it lowers his development costs.

More than 30 of our largest OEMs, like Compusource, switched from competitors to Data General. We think it's because we're more responsive to an OEM's needs. After all, OEMs account for over half of our business. So if you'd like to find out how a computer company can give your business a boost for a change, just give us a call. You'll see how responsive we are.

 **Data General**
We make computers that make sense.

Data General Corporation, Westboro, MA 01581, (617) 366-8911. Data General (Canada) Ltd., Ontario. Data General Europe, 61 rue de Courcelles, Paris, France, 766.51.78. Data General Australia, (03) 89-0633. Data General Ltda., Sao Paulo, Brazil, 543-0138. Data General Middle East, Athens, Greece, 952-0557. © Data General Corporation, 1978.

Data 100 Extends Options For Disk-Based Data Entry

MINNETONKA, Minn. — Data 100 Corp. has announced a disk-based system for data entry users that the company said bridges the price/performance gap between disk and diskette-based systems.

The system, called the Model 77-107, comes with 32K bytes of storage and features a control unit with 2.5M bytes of disk storage, one or two CRT keystations with typewriter- or keypunch-style keyboards and synchronous communications up to 9,600 bit/sec.

Optional peripheral equipment for the system includes printers ranging in speed from 62- to 1,250 line/min, card readers ranging in speed from 150- to

1,000 card/min and 9-track, 800- or 1,600 bit/in. magnetic tape drives.

Data 100's Keybatch software package has been updated to include concurrent IBM 2780, 3780 and Hasp communications capabilities, the company said. In addition, a 3780 emulator is offered with the system that reportedly supports auto-answer abilities for unattended operations.

The Model 77-107 with one CRT, the communications software, a 62 line/min printer and 2.5M bytes of storage leases for \$679/mo on a one-year lease including maintenance: it sells for \$23,286.

Data 100 is at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

High-Speed Core Memory Comes on One Planar Card

WOODLAND HILLS, Calif. — A 128K-word by 18-bit core memory for minicomputer and mid-scale computer applications requiring a large storage capacity and high speed has been announced by Data-products Corp.

The memory module, which the company is calling the Maxi-Store, is said to feature a 750 nsec cycle time and 325 nsec access time. It is expandable to 1M word by 18 bits.

The Maxi-Store uses a three-wire, three-dimensional organization on a self-sufficient planar card containing address and data registers and timing and control logic, he added. It requires only +5 Vdc and +15

Vdc for operation, he noted.

A 19-in. chassis 10.5 in. high can house up to four of the modules, power supply and an extra slot for either a self-test card or a customer interface card. The power supply for the unit is contained in the chassis the spokesman said, and optional chassis wiring permits either a 36-bit double-word configuration or daisy chaining to connect two chassis (eight cards) for the 1M-word configuration.

Prices for the Maxi-Store begin at about \$36,800 for a 1M-word module, the spokesman said from 6219 Desoto Ave., Woodland Hills, Calif. 91364.

Band Printers Offered to OEMs

LEXINGTON, Mass. — NEC Information Systems, Inc. has introduced a series of 300- and 600 line/min band printers for OEM users that feature microprocessor control and extensive use of LSI circuits.

The printers, designated the L300, the L600 and the L250G, are said to have typical throughput rates of 300-, 600- and 300 line/min, respectively. In addition to its normal 300 line/min. operation, the L250G offers a 15 char./in. compressed print capability and 720 point/sq-in. graphics capabilities.

The steel-print band units feature 136 print positions, operator-selectable forms lengths from one to 99 lines, operator-selectable single- or double-line feed and a test print switch.

Electronic vertical formatting control, an audible operator alarm and a slew rate of 15 in./sec are also featured.

An original and up to five copies can be produced on paper ranging from 6- to 18 in. in width, using a choice of font styles in Ascii character sets of 48-, 64-, 96- and 128 characters.

Interfaces available on the units are said to offer compatibility with Centronics Data Computer Corp. and Dataproducts Corp. equipment, as well as RS-232C equipment.

OEM prices are approximately \$3,200 for the L300, \$4,200 for the L600 and \$3,400 for the L250G. The firm, at the U.S. subsidiary of Japan's Nippon Electric Co., is located at 5 Militia Drive, Lexington, Mass. 02173.

Tape Accommodates 6,250 Bit/In. Drives

SANTA CLARA, Calif. — Memorex Corp. has introduced a high-density magnetic tape designed particularly for 6,250 bit/in. tape drives.

The tape, which the company is calling Cubic HD, comes on the company's Superreel computer tape reel. The one-piece, I-beam hub reel handles the operating stresses encountered in 6,250 bit/in. drives, according to a spokesman.

The chief reasons for tape failure on high-density drives are edge damage and tension stress, the spokesman said, claiming the Cubic HD overcomes these problems.

A sealed, 2,400-foot reel costs \$24.50. Memorex is headquartered at San Tomas & Central Expressway, Santa Clara, Calif. 95052.



FlexiFile 21 is... **21** in

ONE ... Text editing flexible disk system
TWO ... Programmable for your application

ONE ... Sure, FlexiFile 21 has all the usual mini-disk system features: random-access, microprocessor-controlled, TextEdit software with insertion, deletion and search capability. Naturally, FlexiFile 21 is RS232 compatible, and it reduces line charges, CPU access time and data entry errors. Of course, it performs off-line data preparation, on-line data collection and makes your dumb terminal smart.

TWO ... But why order an ordinary mini-disk system when FlexiFile 21 has all the usual features and more? It's programmable for your application. Perhaps your present system doesn't require more capability. Then again, maybe you haven't considered how FlexiFile 21 complements data communications applications such as store-and-forward, and stand-alone applications including secondary data storage and simple word processing. Our customers' applications engineers are working with us to enhance their systems' performance with FlexiFile 21.

THINK 2 IN 1 ... Why buy an ordinary disk system when FlexiFile 21 is "2 in 1"? Write for our Applications Note or call Ron Johnson at 415/969-3700, ext. 47.

- ☐ Please send Applications Notes and Data Sheet.
- ☐ Please arrange a demonstration.

Name _____

Title _____

Co. _____

Address _____

State _____ Zip _____

Phone _____

Application _____

TRI-DATA
800 Maude Ave.
Mountain View,
CA 94043
(415) 969-3700
TWX: 910-379-6978



Interactive Graphics Unit Runs With 360, 370

BOSTON — A two- or three-dimensional interactive graphics unit plug-compatible with IBM 360/370 channels and available in black and white or color has been introduced by Adage, Inc.

The Model 4370 graphics peripheral consists of a channel control unit, display control unit and 21-in. CRT. Each channel control unit is reportedly capable of supporting four display control units, each of which can support as many as four CRTs.

The device incorporates an Advanced

Micro Devices, Inc. AMD 2901 micro-processor and read-only memory control storage and has a transfer rate of 3M bit/sec, or 1.5M bit/sec if the CRTs are remotely connected to the display unit by dual coaxial cables. Cable runs of up to three miles are supported, the company said.

System Features

Features of the system include hardware windowing, 128:1 zoom, depth cuing and the ability to connect other support devices including a joy-

stick, trackballs or digital data tablet. In addition, a four-color (red, orange, green, yellow) CRT unit and a hardware circle/arc generator are offered as options, Adage said.

Hardware and firmware in the graphics unit are used to process channel protocol, error checking and data/command buffering, a company official said, adding that the device reduces the burden on the host 360/370 by performing all image manipulation and interrupt handling normally required for interaction with two- or

three-dimensional images.

A Model 4370 with four CRTs costs \$134,000, according to the company, while a 16-CRT version is available for \$472,000.

Four color beam penetration CRTs are also available for an additional \$18,000 per CRT, and the three-dimensional hardware windowing feature, part of the display control unit, sells for \$7,500. Initial deliveries are scheduled for the first quarter of 1979, the firm said from 1079 Commonwealth Ave., Boston, Mass. 02215.

With SYSTEM 2000[®], you get more than just a DBMS.

You also get

- Multiple DB/DC languages with integrated data dictionary
- Greater productivity in applications development
- Lower software maintenance costs
- Proven reliability & availability for complex applications
- Greatly improved use of your data resources
- A solid foundation for future systems

These are just a few of the special benefits of SYSTEM 2000—the most advanced data base management system on the market



PROFESSIONAL
THE DATA BASE MANAGEMENT COMPANY
12675 Research Blvd., Austin, Texas 78759, (512) 258-5171

SYSTEM 2000 offers something else really unique—MRI Systems Corporation. A company which has been developing data base management systems for almost ten years. A company staffed with 200 highly skilled people. A company which believes in customer services, and stands behind its products.

Visit MRI in Austin, Texas. You'll see that with SYSTEM 2000, you get more than just a great DBMS—you get an entire company.

SYSTEM 2000 Classes Scheduled

MRI Systems Corporation supports a complete data management curriculum, carefully planned to help the DBMS novice become a proficient SYSTEM 2000[®] user. With topics ranging from a basic introduction of DBMS concepts to application analysis methods, each course is taught by an experienced professional instructor. Formal lectures, on-line lab sessions, and discussion periods amplify information presented in the textbooks for each course.

Among the courses offered in the summer program are the following:

- Basic Concepts and Natural Language (4½ days)
- Host/Procedural Language Interface (3 days)
- Data Base Design and Administration (2 days)
- Application Analysis Methods (2½ days)
- Report Writer Fundamentals (2 days)

All classes are open to the public and, during the summer, are scheduled to be presented in:

Austin
Chicago
St. Louis
Washington, D.C.

By special arrangement, MRI will also conduct classes at customer sites. In such a setting, the instructor tailors the standard courses to deal exclusively with the students' own hardware configuration, operating system, and data management facilities.

In addition to MRI's standard curriculum, customized training programs are available.

For additional information, contact

Education and Training Center
MRI Systems Corporation
P. O. Box 9968
Austin, Texas 78766
512/258-5171

Corporate Address: 12675 Research Blvd., Austin, Texas 78759 • U.S. Sales Offices:
Austin • Charlotte • Chicago • Denver • Huntsville • Los Angeles • New York • Portland
• St. Louis • San Francisco • Washington, D.C. • International Sales: MRI Systems
(Canada) Ltd. • Toronto • Ottawa • Digital Scientific Europe Limited (DSEL) • The Hague
• London • Paris • SYNTAX • Milan • BIRA • Stockholm • GJK Co. Ltd. • Tokyo
• Entel/bermex • Madrid • Remote Computing Services • Boeing Computer Services,
Inc. (BCS) • CalData Systems, Inc. • Canada Systems Group • Cie Internationale de
Services en Informatique (CISI) • Computel Systems, Ltd. • Computer Network
Corporation (COMNET) • Computer Sciences Corporation (Infonet) • CYBERNET
Services (CDC) • Datacrown, Ltd. • Frantab • General Electric Company Information
Services • Industrial Life-Technical Services, Inc. (IST) • Information Systems Design,
Inc. (ISD) • Lufon Computer Services • Loewes-Apar Computer Service, Ltd. • Martin
Marietta Data Systems • McDonnell Douglas Automation Company • Multiple Access
Computer Group • Proprietary Computer Services, Inc. • Service in Information and
Analysis (SIA) • Systems Dimensions, Ltd. (SDL) • Telesystems (Paris Telephone) •
Tymshare • United Computing Systems, Inc. (UCS)

Mini Bits

Course for First-Timers Teaches Computing ABCs

WOODLAND HILLS, Calif. — First-time users of small business systems can reportedly prepare for their introduction to computing by taking a self-instruction course from Info 3.

Entitled "Computer Concepts for Small Business," the course tells DP novices how to process various types of data, how to evaluate and select hardware and software and how to implement a successful installation, according to Info 3 officials.

It also presents the requisites of sound business computer applications and covers systems operation including critical management concerns like security and personnel staffing decisions, they said.

Instructional materials include more than two hours of audiocassette tapes and a workbook with more than 200 pages. Through July 15, the course costs \$95; thereafter it is priced at \$140.

In addition, a chart outlining course objectives is available from Info 3 at Suite 193, 21242 Ventura Blvd., Woodland Hills, Calif. 91364.

Off Your Chest

Many users and industry officials have worthwhile things to say to their colleagues but are seldom heard because they lack an appropriate forum.

If you're one of those individuals, here's your chance to get those important opinions off your chest and out into the world where they can do some good. *Computerworld* is now seeking reader contributions for its August "Special Report on Minicomputers and Small Business Systems."

Maybe you're a user who found an ingenious small systems solution to a crucial business problem or who has an unusual installation experience to relate.

Or perhaps you're a company official with industry tips or prognostications that users should know about.

If you have something interesting to say on the subject of minis or small business systems, CW wants to hear from you — and so do nearly 90,000 CW readers.

Contributions should be four to eight double-spaced, typewritten pages long and should be submitted no later than July 20 to Jeffrey Beeler, *Computerworld*, 797 Washington St., Newton Mass. 02160.



Randal Data Systems Link 240

Randal Link 200 Additions Boast 60% More Power

By Jeffrey Beeler

CW Staff

TORRANCE, Calif. — Two additions to Randal Data Systems, Inc.'s Link 200 series of cartridge disk-based business systems provide mass storage units 60% faster than those previously available with the 200 family, according to a Randal spokesman.

Both the Link 240 and Link 250 use hard disk systems that rotate at 2,400 rev/min and transfer 537k byte/sec, he said. The earlier members of the Link 200 line, by contrast, incorporate 1,500 rev/min disk units that transfer 336k bytes/sec.

Randal credited the increased disk system

speed with giving the link 240 60% greater throughput than the Link 206 system it replaces. The Link 250, in turn, provides twice the processing power of the 240, at least in preliminary benchmark tests, the spokesman said.

Randal compared the 240 and 250 in performance to the Digital Equipment Corp. PDP-11/34 and to some of the small business systems from Basic/Four Corp., Qantel Corp. and Wang Laboratories, Inc.

Both additions to the Link 200 series are reportedly hardware- and software-compatible with the Link 500 family at the

(Continued on Page 54)

Several Systems Later, User Cuts Hardware Costs With Mini

By Jeffrey Beeler

CW Staff

BOSTON — Spending for in-house DP hardware has dropped from \$8,200/mo to \$2,700/mo at Hub Mail Advertising Service, Inc. here since the direct mail firm installed its latest DP system.

Hub Mail officials also credited the small business system with helping management isolate the source of earnings losses and evaluate the sales representatives' productivity.

Achieving these benefits, however, didn't come easily for the firm, which maintains mailing lists and performs related functions like creative mail marketing and inquiry fulfillment for 750 customers including non-profit organizations, manufacturers, retailers and service firms. Before settling on its current system, Hub Mail experimented

with a succession of computing alternatives ranging from time-sharing to large in-house systems, none of which completely satisfied its DP needs.

Since installing its latest system, Hub Mail has automated most of its standard accounting functions as well as a program for evaluating sales leads, according to the company's president, Wally Bernheimer. The firm is considering automating several other applications, including a data collection system that could allow Hub Mail to dispense with employee time sheets, Bernheimer said.

Hub Mail first became a DP equipment user in 1964 when the U.S. Postal Service's introduction of Zip Codes forced the company to revamp and reorder all its mailing lists. To accomplish this feat, it acquired an

(Continued on Page 56)

TERMINALS NEW or REFURBISHED

HAZELTINE 1000

ONLY \$495

LEASE: \$35/MO

• 12 LINE X 80 CHAR
• RASTER SCAN • 64 CHAR ASCII

ALSO AVAILABLE: 1200, 2000, 3000,
DUAL CASSETTE, THERMAL PRINTER

from the **VETERANS** in **TERMINALS** — where **WARRANTY**
and **SERVICE** have made **THE DIFFERENCE** for over **10 YEARS!**

LOWEST
PRICES
EVER!

VT50 DECSCOPE
\$995 LEASE: \$70/MO
NUMERIC KEYPAD • DIRECT CURSOR

ALL LEASES: 3-MONTH MINIMUM!

LEAR SIEGLER ADM-3A \$845
• 24 X 80 • RS232 or 20ma loop LEASE: \$60/MONTH

CENTRONICS
103...\$1695
LEASE: \$125/MO
BIDIRECTIONAL • LSI
ALSO AVAILABLE: 101A, 102A

"NEW" **DECWRITER II & III**
LA36-\$1495 LS120-\$2695
ALL OPTIONS • LEASES AVAILABLE

AMERICAN USED COMPUTER

P.O. BOX 68, KENMORE STA.
BOSTON, MASS. 02215

617-261-1100

TI Cuts Prices

HOUSTON — Texas Instruments, Inc. has cut memory costs for its 990 minicomputer and microcomputer line. All parity memory modules for the firm's 990/10 minis now cost 10% less than before, while prices of 990/10 error-correcting memory have dropped an average of 26%, according to a spokesman.

For example, a 64K-byte error-correcting memory that formerly sold for \$3,936 now costs \$2,880.

For the company's 990/4 microcomputers, memory prices have dipped an average 15%, with larger modules showing the greatest reduction. Prices of 40K-byte parity memories, for example, have shrunk from \$1,600 to \$1,240, while the cost of 8K-byte modules has fallen from \$400 to \$368.

Also Gains Dual-Port Option

Ampex Core Add-On Now Fits Eclipses

EL SEGUNDO, Calif. — Ampex Corp.'s Megastore 1223 can now operate with Data General Corp. Eclipse minicomputers as well as with the CPU manufacturer's Nova line, according to an Ampex official.

The auxiliary core memory unit has undergone enhancements that make it compatible with Eclipses equipped with the Model 4019 controller and DG's Real-Time Disk Operating System, the spokesman said.

The Model 1223 also comes with a dual-port option that for the first time allows the unit to operate with two Novas or Eclipses, he added.

Equipped with a built-in controller, the core memory unit stores 512K to 4M bytes and transfers a 512K-byte block of

data in 1.8 msec, Ampex said.

The dual-port option, meanwhile, reportedly minimizes user waiting time by alternately transferring data a word at a time through its two ports.

A 1M-byte Megastore 1223 costs \$21,430, with the dual-port option an additional \$1,300. Both are available from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

Additions to Link 200 Line Boast 60% More Throughput

(Continued from Page 53)

upper end of Randal's business systems line.

The 240 and 250 differ from each other primarily in main memory and operating system, the spokesman explained. While the 240 incorporates a

single-partition memory and uses a time-sharing operating system, the 250 provides a memory with up to 10 partitions and uses a Randal Time-Sharing Operating System II (RTOS II), a partitioned package previously available only to Link 500 users.

In a minimum configuration, the 240 reserves 7K bytes of its 32K-byte main memory for user programs, the Randal source said. As the hardware is upgraded, more and more of the operating system becomes resident in memory; by the time the CPU achieves its full capacity of 64K bytes, the operating software resides completely in main storage, he explained.

As a result, users of larger 240 configurations do not have to access their disk to retrieve a portion of their operating systems, the official added.

In a 48K- or 64K-byte configuration, the 240 reportedly reserves 15K bytes of its main memory as applications space and supports as many as 16 time-sharing users. However, for heavy data entry applications involving 4,800- or 9,600 bit/sec CRT terminals, the practical number of users supported simultaneously by the system is five, the spokesman said.

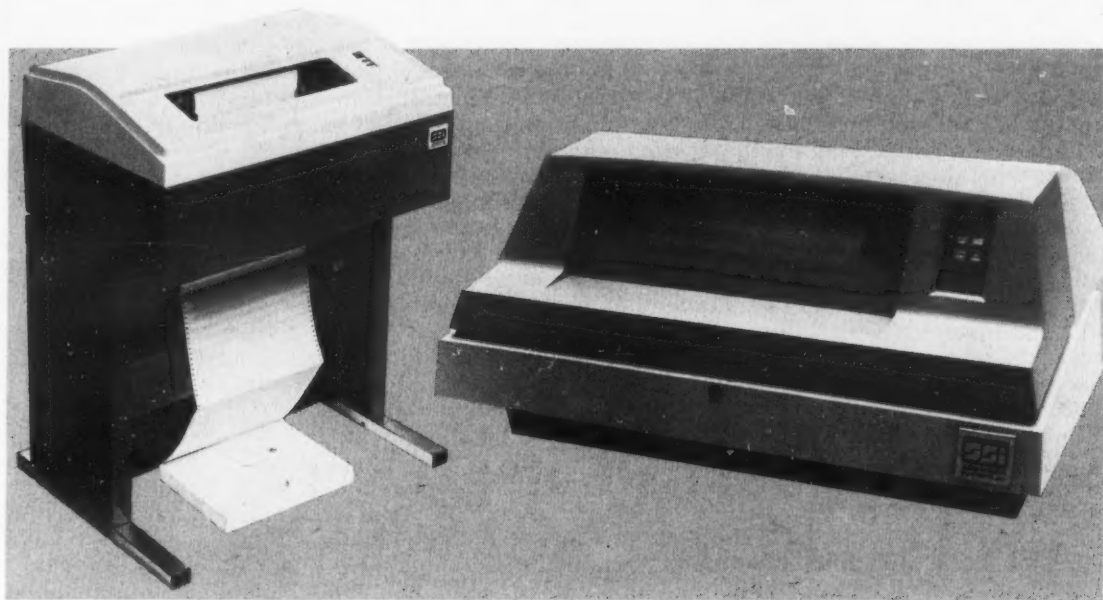
Like the 240, the 250 theoretically accommodates up to 16 users, but because of the partitioned memory and RTOS II software, its practical limit is said to be 10 users.

Identical in hardware to the earlier Link 200s except for its faster disk system, the 240 in its minimum configuration incorporates a 32K-byte CPU, a 10M-byte disk unit with a 5M-byte fixed platter and a 5M-byte removable platter, a CRT terminal and an 80-column, 110 char./sec printer.

A maximum configuration consists of a 64K-byte minicomputer, four 10M-byte disk systems, 16 CRT terminals and a 300 line/min printer.

A minimum 250 configuration incorporates a 64K-byte CPU, three CRT terminals, a 10M-byte disk unit, 110 char./sec printer and battery backup. A maximum configuration provides a 128K-byte mini, four 10M-byte disk units, 16 CRT terminals, a 300 line/min printer and battery backup.

The minimum 240 system costs \$22,900 compared with \$29,900 for the minimum 250. Both are available from Randal at 365 Maple Ave., Torrance, Calif. 90503.



**600 lpm printer
for less than
a 300 lpm**

or

**300 lpm drum or
band printer
for 50% less**

The Southern Systems Wizard has done it again. Twice the speed for less, or the same speed for half the usual cost. Plus total reliability. Because Southern Systems is the only printer supplier that designs and manufactures its own computer-to-printer interfacing and controllers for the full PDP line from DEC (including DECsystem 10 and 20), all DG systems and others.

Parallel (200 to 1500 lpm) or serial printer up to 600 lpm. Southern Systems Wizard makes it work on your computer. 30-day shipment. Complete installation and nationwide service. Cost-savings of about 50% on every system.

Dear Wizard:

Tell me about your money-savings on the:

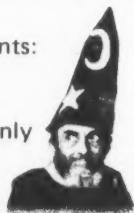
- ☐ B-300 (Low cost band)
- ☐ 2230 (300 lpm)
- ☐ 2260 (600 lpm)
- ☐ 2290 (900 lpm)
- ☐ 2470 (1200 lpm)
- ☐ 2550 (1500 lpm)
- ☐ and about that new M-200 (200 lpm dot matrix)

My computer is a:

- ☐ PDP-11/_____
- ☐ PDP-11/03
- ☐ PDP-8
- ☐ PDP-10
- ☐ PDP-20
- ☐ DG
- ☐ HP/_____
- ☐ Serial (to 9600 baud-600 lpm)
- ☐ Other/_____

My requirements:

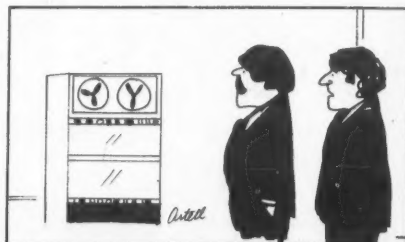
- ☐ Immediate
- ☐ 3-6 months
- ☐ Information only



SSI
SOUTHERN SYSTEMS, INC.

Intracoastal Building
3000 Northeast 30th Place
Fort Lauderdale, FL 33306
(305) 561-5226

Name _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____



'The Programmers Are Really Worried. They Claim the Computer Has Been Reading Self-Help Books.'

System Tracks 8,000 Parts Mini Helps Machine Supplier Double Its Size

BERLIN, Conn. — Polymer Machinery Corp. has doubled its size in the three years since it acquired a mini-computer, and vice-president and general manager Joseph Holthoff believes the system played a major part in that growth.

"I think a lot of companies restrict their growth potential by not using computer power," he said.

Polymer markets and services its own line of particle-reduction equipment as well as German-made Arburg injection molding machines, which fabricate precision-made plastic instruments and equipment parts.

Because customers expect first-class service when one of their machines breaks down, Polymer has programmed its 192K-byte Honeywell Information Systems, Inc. Level 62 mini-computer to track more than 8,000 parts for the Arburgs and the granulator machinery.

Delicate Parts Balance

"Spare parts in our inventory tie up company money," according to Dick Smith, Polymer's vice-president of finance. On the other hand, "if a customer needs a spare part and we don't have it in stock, he may quickly become a former customer," Smith added.

One of the company's main concerns, therefore, is to avoid both overstocking and understocking its inventory.

To make matters worse, Polymer typically must endure a three-month delivery lead time when ordering Arburg parts from their source in Germany.

In addition to the minicomputer itself, the company's inventory management system incorporates a 96-column card reader, a communications controller, four communications lines, two receive-only printers, a 400 line/min line printer and 10 HIS 7700R CRT terminals. With this configuration, Polymer currently runs 220 programs plus the HIS Inventory Management System software package.

Before it acquired its present system, the firm managed its inventory with an IBM System 3/10, which was eventually replaced for "financial reasons," Polymer's DP manager Bob Clark explained.

Handling Orders

When customers order an Arburg part over the telephone, order-entry personnel check their computer-stored inventory listings with one of the CRT terminals to ascertain whether the desired commodity is in stock. The resulting display gives the operators a brief description of the item in question and tells them in which aisle, row and bin it is stored.

If the part is available, it is automatically subtracted from Polymer's inventory listing, and the 400 line/min printer generates a combination picking slip/shipping document.

Near the loading dock, a shipping clerk retrieves the customer's data file with another 7700 CRT terminal. Information on the screen indicates what method of shipment or which courier the customer prefers and lists billing information. When the part is picked up by a shipping firm, data such as the weight of the parcel, time and date of pickup, and name of the transport

company is entered into the data base through the display terminal.

This information has helped Polymer track down lost packages, Holthoff said. Because the company stores the rate schedules of all major couriers plus those of the U.S. Postal Service in its mini, the system produces all invoices in batch mode at night for mailing the next day.

Predicts Order Trends

In addition to controlling spare parts inventory, the Level 62 helps the firm predict short- and long-term order trends.

Since its founding 15 years ago, Polymer has placed more than 5,000 Ar-

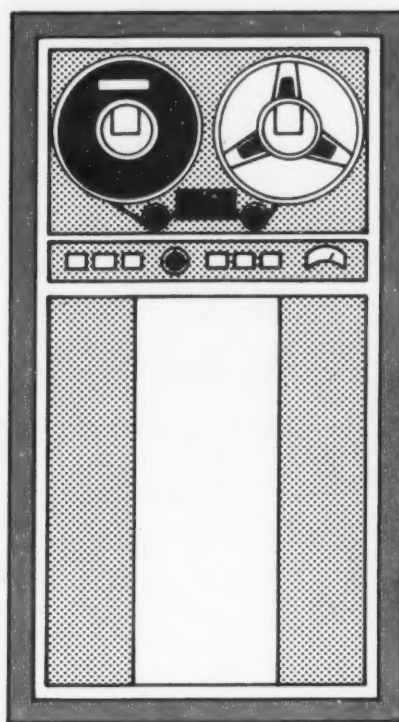
burgs across the U.S. Although each machine arrives from Lossburg, Germany, as a "standard model," Polymer's customers can order as many as 50 options, each requiring 50 to 100 parts.

"The Level 62 helps us forecast the number of Arburgs we will sell, which options our customers will select and which parts we will need on hand at various times to be able to install the requested options," Clark said. "It takes us as long as six months to order and receive an Arburg from Germany. When a customer decides on an Arburg, he doesn't want to wait that long. So our short- and long-range forecasts for parts as well as Arburgs

have to be accurate."

Polymer's back-order control system helps ensure the company will not forget to fill a single order, Clark said. As incoming parts are unpacked at the receiving dock, they are immediately added to the computerized inventory listing through the same loading-dock CRT terminal that records outgoing shipments. When a back-ordered part is entered into the computerized data base, the printer in the order entry department produces packing documents and subtracts the item from inventory.

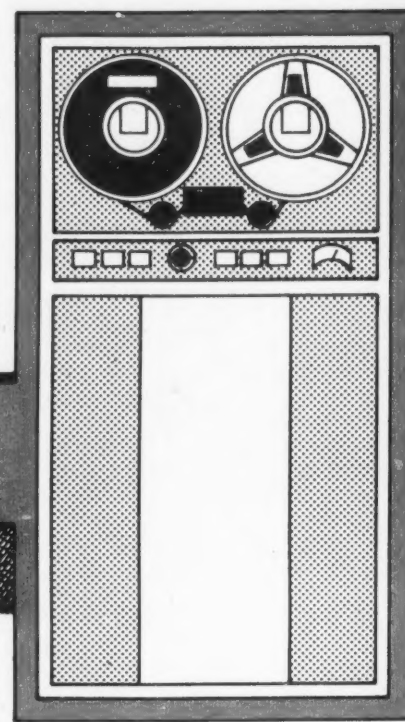
In addition, the system operates a customer credit analysis program that Clark developed to help company officials find out why credits are issued.



**LET PERS
LEND A HAND
WITH YOUR
PERSONNEL
DATA
PROCESSING
REQUIREMENTS**



**COMPUTER
TO COMPUTER**



Data processing jobs for personnel departments often put an extra burden on in-house computer resources, a burden compounded when "special" management reports and analyses are required. And that's frequently the case when EEOC, ERISA, OSHA and other regulatory and business concerns generate demands for unpredictable one-time reports. That's why smart data processing managers are increasingly turning to PERS, the all-purpose personnel processing system from Tymshare that's designed to be fully compatible with, and complementary to, your present in-house computing operation.

There's no strain on the data processing budget with PERS. It can remove either a portion, or all of the load of personnel data processing from your in-house operations at a cost/effective price. Our system uses as basic data the same information stored on magnetic tapes produced through your conventional processing runs.

PERS Decision Support Systems provide personnel managers with convenient, economic special reporting capability and other important advantages. Like ad hoc data retrieval, strong and flexible graphics capability for management presentation, and a variety of math/stat routines — all of which may be accessed from field terminals at any location throughout a user company for comprehensive distributed data access. PERS incorporates 10 system modules to meet standard personnel reporting requirements (see figure below).

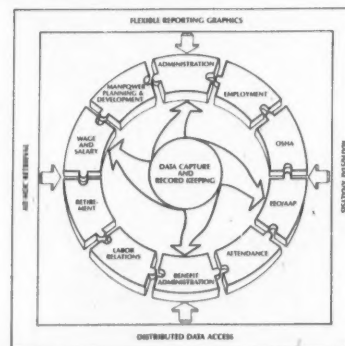
The big plus of the Tymshare PERS approach for DP management is that it blends in readily with just about any existing in-house computer operation. Based on Tymshare's powerful 370 system capability, PERS is the helping hand that's there when you need it for personnel processing requirements.

Many major organizations are currently using PERS across the country to complement in-house

computing capability for their specialized personnel processing needs. They communicate computer-to-computer and reap the benefits of Tymshare's investment in specialized personnel processing programs in a total systems context.

Underlying PERS is the extensive technical, management, and financial resources of Tymshare, Inc., one of the world's leading computer services corporations and a pioneer in the specialized field of total personnel systems support.

Let us lend a hand with your personnel processing needs, computer-to-computer. Call or write today for more information. Contact the PERS representative nearest you, or Tymshare, Inc., attention: Dave Bray, National Manager for Personnel Systems, 20705 Valley Green Drive, Cupertino, California 95014, (408) 446-6000.



TYMSHARE®

The Management-oriented Computing Service

Hartford, (203) 728-5400 Dallas, (214) 638-4200

San Francisco, (415) 941-6010 Los Angeles, (714) 540-5940

Micro-Based Printers Unveiled

MOUNT LAUREL, N.J. — Program-controlled font selection and stored program diagnostics are reportedly among the features of four microprocessor-based line printers from Okidata Corp.

The Slim-Line series consists of 160- and 300 line/min models that print 7 by 7 characters plus 125- and 250 line/min models that output 5 by 7 or 9 by 7 characters.

All four printers provide 12 user-selectable font styles including lower case, double height and double width plus double height and width, a spokesman noted. During self-test, they also provide users with installation records by printing a coded header that lists machine options and revisions, he added.

In addition, the products are said to come with parallel interfaces for Centronics Data Computer Corp. and Dataproducts Corp. printers as well as with an RS-232 interface that accommodates seven switch-selectable protocols, seven switch-selectable speeds, auto-start and a choice of buffers.

Deliveries of the 250- and 300 line/min units, which measure 23 in. wide by 22 in. deep and 10 in. high, will begin this fall; deliveries of the 125- and 160 line/min models, which measure 8.5 in. high, will start during the summer.

In OEM quantities, prices for the units start at \$2,500, Okidata said from 111 Gaither Drive, Mount Laurel, N.J. 08054.

User Finds Mini Affordable After Trying Several Options

(Continued from Page 53)

IBM 360/20, becoming the first direct mail firm in New England to install a computer system, Bernheimer claimed.

With the newly installed hardware, the company soon automated its mailing lists, payroll, job-cost accounting and accounts payable, while continuing to manually perform accounts receivable, general ledger and sales analysis.

Soon, however, the IBM equipment gave way to a Honeywell Information Systems, Inc. 120 with five tape drive systems and an off-line printer. Rental for the HIS system totalled \$11,000/mo at a time when the company's annual revenues barely

reached \$4 million, Bernheimer recalled.

Although Hub Mail used the HIS system for five years, "we kept losing money on the list maintenance aspect of the business, partially because of the seasonal nature of direct mail activity," the company president explained. "The summer months are usually slow, while the November-December holiday season taxes our capacity."

Service Bureau Tryout

Concluding that their company needed a large system only a few months of the year, Bernheimer and his associates in 1973 delegated the list maintenance function to a service bureau. With one of their major applications no longer on-line, Hub Mail officials decided to replace their relatively large HIS system with a minicomputer to which they planned to assign their remaining commercial and accounting functions.

Eventually, they also planned to add accounts receivable and sales analyses to the prospective system, while continuing to do general ledger and profit analysis manually, Bernheimer said.

After examining several minicomputer options, Hub Mail finally chose to perform its commercial applications with a Singer Co. System Ten, at the time one of the few minicomputer-based systems that could support interactive CRT terminals. Two years after signing the Singer lease, however, support for the system deteriorated, Bernheimer said, and Hub Mail once again had to reassess its DP options.

Company officials first evaluated hardware from Digital Equipment Corp., Data General Corp. (DG), Nixdorf Computer, Inc. and Burroughs Corp. They then narrowed the field of candidates to DEC and DG before selecting the latter's 128K-byte Eclipse minicomputer with an 800 bit/in. tape drive system, 96M-byte disk system, four CRT terminals, teletypewriter console and 300 line/min printer.

A systems house oversaw Hub Mail's hardware conversion and wrote its program development software, which included extended Basic and DG's Mapped Real-time Disk Operating System.

Hub Mail picked the DG system over rival hardware partly because of the availability of an industrial marketing applications package developed for Eclipse systems by a West Coast firm. Dubbed the Inquiry Handling and Analysis system, the package performs sales lead evaluations, Bernheimer explained.

"We have a lot of competitors in the New England area that offer an inquiry-handling service," he said, "but none of them saves the data and uses it for follow-up information such as cost-per-qualified lead, development of qualified prospect lists, media analysis and other marketing information."

In addition to providing follow-up analyses of inquiries, the system performs all Hub Mail's accounting functions, including those that were formerly done manually, Bernheimer said. These functions include payroll, accounts receivable and payable, general ledger and job-cost accounting.

The new MDS 21/50. Series 21 grows bigger for you.

Mohawk Data Sciences announces System 21/50, the latest member of the Series 21 family of distributed processing systems.

System 21/50 doubles the power and doubles the capacity of Systems 21/20 and 21/40—but retains the pricing breakthroughs that have made Series 21 a worldwide solution to data entry, stand-alone operations and distributed processing requirements.

A System 21/50 performs multiple functions, uses high level language, and does the local office processing you need right now. And the System 21/50 grows with you. With

main memory up to 128K. With disk storage to 20 megabytes. With printers from 45 cps to 600 lpm. And with magnetic tape drives and communications options as you need them.

Now with three Series 21 systems to choose from, you can mix and match just the right amount of power for your dispersed locations. System 21/20 for easy conversion of source documents. Next, the System 21/40 for local processing power in small offices. And now, the new System 21/50 for more sophisticated applications requiring multi-programming, larger internal memory, and faster processing

speeds. Best of all, Systems 21/20 and 21/40 can be expanded to the System 21/50.

Wherever in the world you find Series 21, you'll find MDS customer support and field engineering as well. Our 300 worldwide sales and service offices serve over 6,500 customers around the globe.

Send us the coupon right now, and learn more about the MDS Series 21—the one-stop solution to your distributed processing needs. Or call James J. Byrne, V.P. Sales, (201) 540-9080.

Series 21, MOBOL and MDS are trademarks of Mohawk Data Sciences.

Mohawk Data Sciences
1599 Littleton Road, Parsippany, N.J. 07054

Send me information on the MDS Series 21

☐ System 21/50 ☐ System 21/40
☐ System 21/20

Name _____

Title _____

Company _____

Street _____

City _____

State _____ Zip _____

☐ I'm in a hurry. Have a representative call.

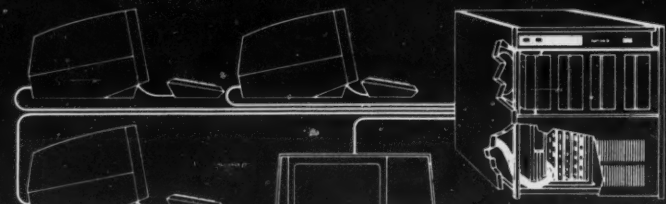
CW62678

MS

Mohawk Data Sciences

Multi-function concurrency, three tasks at same time.

Binary synchronous communications. Industry standard interfaces.



Peripheral options include wide range of printers plus tapes and disks.

Two-level software: EDEP—easy-to-use formatted data entry package—and MOBOL high level user language.

From 1 to 4 operator stations, each with 1920-character screen, choice of keyboard styles.





TRANSMISSION:
 Page; Field; Modified
 Field; Prompted
 Transmission;
 Device Status;
 Function Keys.



INTERFACE:
 EIA RS-232; Current
 Loop; 17 data rates
 (switch selectable)
 including 19, 200
 chars/sec; Half
 duplex support;
 Line turnaround
 characters; Reverse
 channel.

**EDITING
 FUNCTIONS:**
 Insert/Delete line
 and character;
 Columnar Tabbing;
 Cursor Addressability;
 Cursor Sense;
 Numeric Only fields;
 Security fields;
 Erase Variable;
 Protected fields.



VIDEO:
 Normal; Reverse;
 Blink; Low/high
 intensity; Underline.

OPTIONS:
 Buffered Printer
 Interface (RS-232
 and parallel)
 separately
 addressable from
 the CPU; Standard
 Polling; Paging.

KEYBOARD:
 Removable, solid
 state with
 international
 character layouts.



When it comes to flexibility, the Infoton 400 Data Display terminal can hand you all you need.

Designed around the Z-80 microprocessor, it offers complete control of all Blocking and Editing functions through software settable modes. One thing that's especially easy to handle about the I-400 is its cost; at \$1,095 in quantities of 100 or more, it's the most versatile terminal for the price you can get your hands on.

More information on the I-400 is quickly within your grasp. Call Infoton toll-free at (800) 225-3337 or 225-3338. Ask for Barbara Worth. Or write Barbara Worth at Infoton, Second Avenue, Burlington, MA 01803.

Prepared by Chickering/Howell, Los Angeles.



 **Infoton 400**

Mini Provides Firm Support for Floor Maker

MAPLE SHADE, N.J. — An industrial flooring manufacturer here is using a Microdata Corp. Reality system for its sales support and reportedly liked the equipment enough to become part owner of a local Microdata dealership.

Stonhard, Inc. which markets a line of 20 products through 85 salesmen in 10 regions, previously used an IBM System/3 to run its accounting programs. The company decided in 1974 to automate its sales support, but found a batch-oriented System/3 could not support on-line terminals.

After evaluating several alternative small business systems, Stonhard chose a Microdata system, although the firm continues to use the System/3 for accounting purposes.

Stonhard's salesmen in the field each day used the phone or the mail to send in their call reports and requests for quotations.

The information is then keyed into the system to form a combined customers-and-prospects data base that contains more than 100,000 records.

Various attributes in the records allow data to be retrieved in a number of different ways. Based on request for quotations, the company generates proposals. When the proposals are signed and returned by the customer, orders for materials are written.

Once a job is completed, a salesman sends in a completion report, and the system prepares an invoice and updates the salesman's commission record.

ord.

The Stonhard system consists of the Reality with 64K bytes of memory, a 40M-byte disk drive unit, a 600 line/min printer, two Diablo systems, Inc. printers and 16 on-line Lear Siegler, Inc. terminals.

The 16 CRT terminals are used by clerks in the sales support department to enter call reports and by the four sales coordinators to retrieve data and help agents in the field solve sales problems, Stonhard spokesmen said.

In addition, each of the regional sales managers has a portable teleprinter to access the system from their homes.

The system allows Stonhard to produce a sales analysis at any time and by various attributes including sales region, type of customer, sales-

man, date or volume of previous sale, company officials explained.

With the system, salesmen have reportedly boosted their sales because they can receive up-to-date information on customers and territory. The system also periodically reminds salesmen to follow up sales prospects and helps regional managers pinpoint the most promising of these potential customers, Stonhard said.

When a large corporation is building a new plant, for example, the company can find out whether Stonhard has approached that corporation before and then solicit the potential customer's business. Managers can also review each salesman's performance any time during the week using one of the portable terminals, the officials noted.

Customized Correspondence

Customer correspondence can reportedly be customized according to the company's specifications. One result of this capability is that direct mail returns have increased by 33% since the system's installation.

Another result is that while the company's business has doubled, its sales support staff has remained the same size, the firm reported.

The company also plans to use the system for inventory of raw materials as well as for finished products, the records of which are already automated by the system.

The CPU cost approximately \$110,000, and the printers and CRTs cost about \$80,000, according to the company. Amortized over five years, the monthly price totals approximately \$3,000 plus maintenance. The Reality system, which incorporates almost 20 terminals, therefore costs nearly the same as the System/3.

An additional advantage with the current system is that all data entry is done by clerical personnel who needed only a few hours of training to learn how to operate the equipment, spokesmen explained. Management personnel use the system as well — the company's controller functions as DP manager.

Stonhard's full-time DP staff consists of two members — the coordinator, a former clerk who helps solve operator problems; and a programmer.

One of the most important reasons for the success of a system is corporate commitment, according to the firm, which evaluated its configuration not in terms of dollars, but as a tool that would allow salesmen to do jobs which were previously impossible, officials here said.

Stonhard's case history was taken from Management Information Corp.'s publication, How Small Businesses Use Computers. The publication is a 40-page collection of applications case histories and can be purchased for \$15 from the firm at 140 Barclay Center, Cherry Hill, N.J. 08034.

PERIPHERALS FOR LEASE



ALANTHUS LEASING COMPANY can offer you a customized short term operating lease on IBM and plug compatible peripheral equipment. And provide you with substantial savings.

Flexibility is our hallmark. Your particular corporate requirements will be met with a lease that will satisfy these specific needs. ALANTHUS has over \$225 million in computer and peripheral equipment on lease in the United States and overseas, generating savings of more than \$17 million annually. We invest in and own a large share of our equipment so we are not simply "packagers" who work for a front-end fee and then disappear.

Whether you are thinking about purchasing or leasing new computer equipment or adding on additional IBM or plug compatible peripheral equipment, call ALANTHUS. We have the ability and the resources to provide you with the best leasing program to solve your particular corporate needs.

alanthus leasing company

111 High Ridge Road
Stamford, Connecticut 06905
203-348-4820

Mid West Region
Northeast Region
Southeast Region
Western Region

Tony Saladino 203-348-4820
Larry Bender 203-348-4820
Bob Farmery 404-955-7438
Bill Kennedy 415-362-1218



Extends Microsystem Line Futuredata Aids 6802, 8085 Development

LOS ANGELES — Futuredata Computer Corp. has extended its line of Microsystem microprocessor development systems to support users of the Motorola Semiconductor Products, Inc. 6802 and the Intel 8085.

The Microsystems, which currently support the 8080, 6800 and Z80 microprocessors, offer hardware and software capabilities. Hardware development is backed by Microemulator in-circuit emulator and debug packages; software tools include monitors, debuggers, editors, assemblers, utilities, relocatable macro assemblers, linkage editors and Basic compilers, according to a spokesman.

Range of Systems

The user can select a range of disk- and tape-based Microsystems for the 6802 and the 8085 according to the level of performance needed, Futuredata said. Each system includes the MPU with up to 64K of memory; a high-speed, 960-character CRT with Ascii keyboard; dual floppy disk or cassette tape unit; operating system software; and documentation.

System features include two RS-232 serial ports, an 8-bit parallel TTL I/O port, real-time clock, programmable read-only memory (Prom) bootstrap and memory write-protect under software control.

The Microsystem/31 Model 6802 and Microsystem/31 Model 8085 with the Microdisk/3 dual 8-in. double-density floppy disk unit and 16K memory cost \$7,975 each.

The Microsystem/32 Model 6802 and Model 8085, each of which includes the Microdisk/4 dual 8-in. double-sided, double-density floppy disk unit and 16K memory, cost \$8,975. The Microsystem/15 Model 6802 and Model 8085 systems each include 32K bytes of random-access memory (RAM) and the firm's Quickrun, a co-resident assembly and interactive debugger system, with monitor/debugging, editor and assembler in memory and source and object code. Each is priced at \$4,975.

The optional Microemulator costs \$1,250; Basic compiler and resident disk operating system packages are available separately at \$300 each. Additional 16K RAM modules start at \$650.

Futuredata is located at 11205 S. La Cienega Blvd., Los Angeles, Calif. 90045.



Futuredata Microsystem Development System

California Managers Report Crime Wave Hitting Retail Shops

By Tim Scannell
CW Staff

Computer stores and hobbyist marketplaces in southern California are finding themselves the target of thieves who concentrate on small, expensive items such as boards and microcomputer memories.

Selling computers and computer parts, according to one area manager is no longer "the nice, friendly business it used to be."

"We had quite a few problems with thefts in January and February," Allan Porter, president of

Mission Control, recalled. Located on Wilshire Blvd. in Los Angeles, the store has apparently been the one hit hardest by the new wave of criminality.

"The thieves took a total of four boards out of two different computer systems," Porter said. "In one instance, they walked in and asked the salesman to take the cover off the machine, which he obligingly did."

"They then distracted him for a moment and he turned his back. In that short period of time, they walked off with two of the

boards."

The criminals appear to be "fairly technical," Porter said, "a little familiar with computers in general. They knew, for instance, that one machine had an S-100 bus and they also knew that the machine used part of the motherboard for the serial and parallel I/O ports."

The thieves had the salesman remove the computer's cover under the pretense of wanting "to see what [the motherboard] looked like."

Selective Thieves

The robbers are proving to be very selective. "There are lots of parts in the machine, some of them more expensive than the ones they took. They knew just what they wanted and stole just particular boards," Porter noted.

Police classified the thefts as burglaries rather than as shoplifting because of the selectivity that was involved. "First of all, we had to explain to them just what a board was and the cost of the missing piece," Porter said. "It turns out that if someone comes in with the intent to steal and steals a particular item, then it's classified as a burglary. If they come in and just see something lying around and they pick it up, that's shoplifting."

"We really didn't understand the difference until we talked with our insurance man. All we knew was that we were out a couple of thousand dollars," he added.

Insurance policies usually cover burglaries, but will not cover shoplifting, he said.

"Several stores in the Los Angeles area have experienced similar problems, Porter observed. One store that had been open for less than a week had an entire mainframe stolen.

(Continued on Page 60)

Micro Chips

Master I/O Board Works With S-100

CHICAGO — An S-100 bus-compatible I/O board, introduced by Space Time Productions, is said to contain enough read-only memory (ROM), random-access memory (RAM) and I/O to replace boards containing real-time clocks, frequency/period counters, programmable read-only memory (Prom)/Ram and parallel serial I/O.

The Master I/O Board contains 1K of RAM and 3K of ROM, as well as two 8255-type chips that can be programmed as I/O, interfacing and bidirectional ports; one 8253 chip that incorporates three 16-bit counter/timers; and one 8251-type peripheral chip that can be programmed for various clock division ratios, Space Time said.

The bare board is priced at \$47.50 while the complete unit, assembled and tested, costs \$369. Documentation including schematics, a parts list, parts layout

and operations manual is also available from the company at 2053 N. Sheffield, Chicago, Ill. 60614.

Word-Processing Program Supports Pet Micro Users

BROOKFIELD, Conn. — Connecticut Microcomputer Corp. has unveiled a word-processing program for users of Commodore Business Machines, Inc.'s Pet microcomputer, RS-232-type printers and the firm's printer adapter.

The program permits the composing and printing of such materials as letters, flyers, manuscripts, advertisements and articles, according to a spokesman. Script directives include line length, left margin, centering and skip.

Edit commands allow the user to insert, delete and move lines, change strings, save data on cassette, move data up and down, print and type, he added.

The word-processor program costs \$29.50 from Connecticut Microcomputer at 150 Pocono Road, Brookfield, Conn. 06804.

Prototyping Circuit Board Accommodates 70 DIPs

SYLMAR, Calif. — A prototyping circuit board from Vector Electronic Co., Inc., said to be bus- and shape-compatible with Altair and Imsai microcomputer boards, holds up to 70 14-pin or 16-pin dual in-line packages (DIP) or any combination of DIP sockets with .3-, .4-, .6- or .9-in. lead spacing.

Called the Any-DIP plugboard, the Model 8804 has 100 card-edge contacts on .125-in. centers to accommodate an S-100 bus organization, the firm said.

Two 100-hole rows of individual .1-in. spaced pads across the top of the board permit additional input/output via ribbon wire assemblies, a spokesman noted.

The 8804 plugboards are priced at \$21.95 each in quantities of one to four; \$19.76 each in quantities from five to 24; and \$17.56 each in quantities over 25.

Vector Electronic is at 12460 Gladstone Ave., Sylmar, Calif. 91342.

Users of 6800-Type MPUs Offered Industrial Basic

LAFAYETTE, Ind. — A Basic interpreter for Motorola 6800-type MPUs was designed by Wintek Corp. for process control and monitoring functions associated with industrial applications.

Dubbed the Wintek 4K Basic, the interpreter resides in random-access memory (RAM) or programmable read-only memory (Prom) and features control of interrupts, direct memory read and write, Assembly language subroutines and a flexible I/O, the firm claimed.

The unit retains many of the advantages of an interactive, high-level language and incorporates control structures such as IF ...

THEN ... ELSE and ON ... GOTO/ON ... GOSUB, a spokesman added.

Unattended Operation

The interpreter immediately enters the "Run" mode when the Basic program is stored in Prom. This reportedly allows for unattended operation in dedicated applications.

The Wintek 4K Basic is available on cassette for \$95 or in Prom or a read-only memory (ROM) module for \$299.

The source listing, priced at \$95, and an OEM license, for \$2,000, are also offered by the firm at 902 N. 9th St., Lafayette, Ind. 47904.

DP Retailers in California Beset by Wave of Thievery

(Continued from Page 59)

"The individuals acted very interested in the computer and then asked the salesman to go into the backroom for a piece of literature which, it turned out, he didn't have," Porter said. "When he came back out, they had walked off with the machine."

"It doesn't happen every day and the thieves usually concentrate on new and high-priced items," according to Greg Puckett, marketing manager for Jade Computer Products in Lawndale, Calif. Jade recently lost a 32K memory board and a CRT controller to burglars.

"We've never been hit by a team," Puckett said, "just individuals." At the

time "we only had two people at the counter and it was very easy for them to be distracted just by general goings-on in the store."

Reasons for Increase

This type of crime has increased for various reasons, according to several managers. "There's an increase in the number of users," Porter said, "and most of the boards were hobbyist-oriented."

There has also been an increase in the number of publications that carry requests for used equipment. "People probably see an ad in one of these magazines or newsletters, make a deal for that board and then walk into a store" to steal it, Porter conjectured.

"Before, it was a fairly restrictive type of people we were dealing with," Puckett commented. "More people coming through your doors increases the probability of there being more and more bad people among your clientele."

A spokesman for the Sunshine Computer Co., in Carson, Calif., however, offered a more definitive reason why there is currently an increase in computer store thefts. "There are people out there that I consider to be bums and they don't want to pay like everyone else does," he claimed. Those people choose instead to steal "whatever they can get their hands on."

Two stores, Byte Shop of Santa Barbara and Tech-Mart in La Jolla, Calif., hinted that perhaps the problem lies in the type of clientele that a particular business attracts. "We've had no problem at all," the Byte Shoppe spokesman said. "We sell primarily business systems and we have businessmen that come in here — we don't carry hobbyist equipment at all."

Tech-Mart deals in whole systems rather than over-the-counter parts, a spokesman for that firm stated, "so our deliveries are under contracts for the most part."

A number of stores have taken several precautionary measures to guard against future burglaries. Mission Control secures all boards to the computer's chassis by using a stainless steel cable and clamps so the boards can't be removed, Porter stated.

A recently instituted policy also forbids employees to remove covers under any circumstances. "We watch people more carefully and are particularly suspicious of anyone that wants to see the inside of a machine," Porter said.

So far, he added, the tighter security measures have not hurt sales. "A hobbyist knows what the inside looks like," he pointed out, "and a businessman doesn't care."

WANTED

by Wang.

OEM SYSTEM HOUSES WITH TOO MANY VERSIONS OF THE SAME SOFTWARE

These Systems Houses are also known for: Successful multi-task installations; sales/marketing capability; software support organization; financial capability.

If the limitations of the systems you're now supporting mean supporting multi-versions of the same software, you're one of Wang's WANTED Systems Houses.

Wang's VS (virtual storage) computer can grow from a 64K, \$40,000 system to a 512K, \$500,000 system without rewriting a single line of application code. This means you can hold down software development and support costs while supporting a wider range of users.

The VS supports BASIC, COBOL, RPG-II and Assembler. IBM 360/370 instructions. And because it's the most interactive system available, your programmers can spend more time writing new software, not rewriting existing code.



Want to know more? Call or write Wang System House Program, Dept. 81, Wang Laboratories, Inc., One Industrial Ave., Lowell, MA 01851, (617) 851-4111. (Ask for V.S. Operator 810.)

Name _____
Title _____
System House _____
Address _____
City _____ State _____ Zip _____
Phone _____

DP85/CW6268

168

System available
for short
term sublease.

COMDISCO
312-698-3000

Adapso Report Predicts Services to Grow 17%/ Year Through '82

By Marcia Blumenthal
CW Staff

NEW YORK — The computer services industry is expected to continue growing at an annual rate of 17% through 1982, with revenues predicted to climb from \$6.9 billion in 1977 to about \$16 billion by 1982.

These and other statistics from the annual industry report were presented during the fifth annual press and financial analysts conference held here recently by the Association of Data Processing Service Organizations, Inc. (Adapso).

In addition, computer service industry experts analyzed the opportunities and threats resulting from such trends as minicomputer proliferation, IBM "revenue-gobbling" strategies and a possible recession.

Peter Cunningham, president of Input, the market research firm which prepared the report for Adapso, said that processing services accounted for \$5.2 billion of the annual computer services revenue in 1977, with professional services following with \$1 billion and software products with \$700 million. The overall pretax industry profit for the year was 11.3%.

Software Fastest

Although the industry is growing at about 17% annually, Cunningham noted that software products were the fastest growing sector of the services industry and could take off even more rapidly than projected, particularly if IBM unbundled its operating system software.

John Imlay, president of Management Science America, Inc., said that operating systems are the most profitable and fastest growing segment of the software sector.

As evidence of software's profitability, Imlay pointed to the entrance of some of the "Big Eight" accounting firms into the soft-

ware business and IBM's announcement of a personnel application package.

Like software, the international market, particularly in Western Europe, is growing quickly. Cunningham said revenues from the international market increased 49% from last year.

Encroachments by Minis

Although the software and international segments were predicted to grow faster than the service industry as a whole, the financial analysts were deeply concerned about users of processing services moving to in-house minicomputers.

Time Seen Ripe to Start New Technology Firm

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — "Now is the best time since 1969 to start a new technology company," according to venture capitalist Brent T. Rider.

However, Rider's optimism was qualified with a caveat — "To obtain funding, you must have a company, not an idea," the president of Union Venture Corp. of Los Angeles warned.

Rider and other venture capital financiers and founders of high-technology companies also stressed that a well-organized management team is as important as new technology when seeking funding in today's venture capital market.

Speaking at a session at the National Computer Conference here recently, panelists emphasized the need to size up the marketplace and consider the retaliatory strategies of competitors before launching a product with new technology.

Most importantly, they cautioned that the new product must

Cunningham responded that 80% of the processors completing the survey admitted to being vulnerable to the influence of minicomputers, with most companies estimating about 30% of their business could be threatened.

However, Cunningham said that smaller companies perceived the threat as more imminent than larger companies did. In fact, the survey indicated that general business applications, particularly accounting, which is the mainstay of many smaller processing firms, would be the hardest hit by a user switching to an in-house mini.

However, as a means of parry-

ing the minicomputer's thrust, Richard L. Crandall, president of Adapso and also president of Comshare, Inc., suggested that the processing firms could turn a threat into an opportunity.

There are apparently two camps in this growing battle. One group of processing firms will install minis at user sites; 60% of the firms surveyed said they would resort to this tactic either this year or next year. The other group will wait it out and see what happens.

Another threat comes from IBM, the panelists agreed. But, upon probing by the financial analysts during the question-and-answer session, the industry representatives did not see IBM as a major threat to the current base of business.

The inroads IBM could make into the current customer base of the service industry would not be great enough to satisfy the revenue-gobbling needs of the giant. IBM, according to Crandall, would most likely go after the giant-sized new markets such as electronic funds transfer, electronic mail and the \$40 billion printing industry.

Effects of Recession

Another major concern of the financial analysts was the impact of a recession on the services industry. While not glossing over the effects of a recession, Crandall indicated that some sectors of the service industry are more immune to a recession than others. Processing will continue to be done as long as a company has business, he noted.

Besides the danger of a recession, Crandall pointed to some warning signals for the industry to monitor. In particular, Crandall mentioned that staff costs in the industry are rising because of the demand for people with a wide range of expertise, and these people are paid consultant's rates.

Furthermore, he stated, the product must have a completed prototype before venture capitalists will bite. "Venture capitalists will not fund pure research," Rider said emphatically.

Attractive Areas

In assessing opportunities for venture capital, Rider said that investors are currently interested in new companies involved with peripherals, microcomputers and packaged systems.

Companies starting new businesses are expected to show black ink much earlier than they

(Continued on Page 62)

COMPUTER INDUSTRY

DEC LA 180's-\$1950 with/EIA IN STOCK!!!

Single Source—Coast to Coast ☐ Fast Delivery—Nationwide
National Service—Our Own Experts ☐ Low Cost—Big Savings

DAS STOCKS DEC's entire data terminal line, including all popular options. We also SERVICE what we sell, nationwide. Other dealers PROMISE a lot, DAS delivers any quantity at LOW PRICES. We also stock TI's 745, 743, 765, 763; Diablo's 1620 and 1641; Lear Seigler's ADM 1, 2, 3; and the Teletype 43. Compare for PRODUCT, PRICE, DELIVERY and SERVICE. You'll come to "THE DATA TERMINAL PEOPLE."

Call your local district office,
or toll free numbers: East 800-631-9604 West 800-227-4406



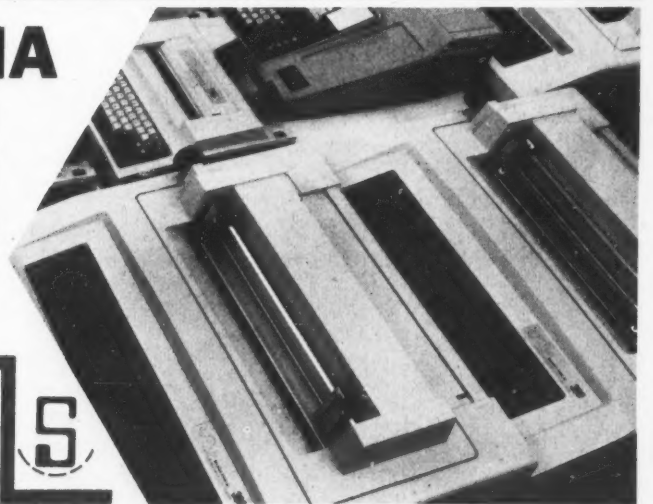
"THE DATA TERMINAL PEOPLE"

Data Access Systems, Inc.

Corporate offices:
100 Route 46, Mountain Lakes,
N.J. 07047 • (201) 335-3322
or Toll Free (800) 631-9604

District offices:
Boston — (617) 933-8822
Washington, D.C. Area — (703) 525-2923
Phila. So. Jersey — (609) 854-0070

Chicago — (312) 298-0777
Los Angeles — (213) 538-4100
San Francisco — (415) 391-5535



IBM Series/1 Shipments Seen Peaking in 1980

ANAHEIM, Calif. — The biggest year for shipments of the IBM Series/1 minicomputer is probably two years away, according to a man who makes plug-compatible peripherals for IBM's first entry into the world of minicomputers.

Louis B. Horwitz, president of Datum, Inc., said Series/1 shipments will be good this year and next, but he expects the best year for such shipments to come in 1980.

IBM will place at least 25,000 of the units, he said, but added that the firm would probably ship 50,000 even though the first year of shipments has not been up to IBM's expectations.

IBM's shipments were below corporate expectations basically because the firm did not realize it was playing in a new marketplace in which it takes the customer some time to evaluate new products.

For the first year, Series/1 systems have been going out in evaluation quantities, Horwitz said, and now the

production orders are coming in and the Series/1 is "popping up all over."

But because IBM is not offering a full range of peripheral equipment for the Series/1, the firm has left a larger market for independents such as Datum, he indicated, adding that some IBM salesmen are recommending Datum tape for the Series/1 rather than lose the order to a mini maker who offers a full line of peripherals.

In 'Good Shape'

Datum, which offers a complete line of Series/1 peripherals, is in particularly good shape, Horwitz indicated, because he "doesn't believe IBM will move into tape," which is Datum's strong point.

"IBM will ignore tape because of its disk orientation," he said.

Today the Datum business is a "nice mix" of systems houses and software companies that are moving into the Series/1 marketplace, he said, adding that these types of firms will probably

make up the bulk of the Series/1 marketplace over the long run, even though IBM is now selling some of the systems to its traditional Fortune 500 type of customer.

The entry of Control Data Corp. into the peripherals market for the Series/1 will only serve to give the marketplace visibility, he said, and while CDC will provide more competition, its entry is really a plus.

In addition, the plug-compatible manufacturer's president indicated that there would be a great deal of turmoil in the marketplace for the next few years, particularly in the disk arena as that technology changes rapidly.

In another area, Horwitz indicated that there will be some trouble ahead for the microcomputer marketplace, since there are so many undercapitalized entrepreneurs in the business today and users are offered some questionable products such as audio tape cassettes for digital storage.

Present Status

Datum, he said, has gone through some troubles and is now a "viable company" for its size (\$18 million in revenues last year).

Presently, peripheral products make up 65% of the firm's business, he said, and the firm is growing at between 35% and 40% per year on a revenue basis.

At the same time, it is making enough of a profit to be able to invest more than \$1 million yearly in R&D, which amounts to about 6% of total sales, he said.

The stock now sells for approximately \$4 per share, he added, indicating that when it gets to around \$6 per share it might be used to mount some acquisition campaigns.

Seeks Mini Growth

The firm basically wants to grow in the minicomputer peripherals area, Horwitz indicated, expanding its product line in the electromechanical peripherals field, first in tape and then in disk.

Around 80% of Datum's peripherals business is in tape today, he said, adding that the firm is staying away from the floppy disk market because the margins are slim even though the interface is "easy."

While the firm is primarily a peripherals supplier, Horwitz indicated that it might consider software packages for the Series/1 in the next few years in order to expand its position as a supplier to that marketplace.

Overall, Datum should be a \$35 million company in the "next couple of years," he said, adding that it needs to get to that size in order to be able to withstand any downturns in the economy.

Time Ripe for Beginning Technology Firms: Panel

(Continued from Page 61)

were in the past, he noted.

A bright ray in the venture capital market, Rider explained, is the Steiger Bill now in Congress. If passed, it will result in reduced taxes on capital gains. Entrepreneurs will benefit from the bill's passage, Rider predicted, because more investment will be spurred not only from venture capitalists but also from all sectors of the investing community seeking new companies.

It now looks as though the bill has a good chance of passage because the Administration has eased off on its earlier opposition stance, Rider said.

Factors to Analyze

Leonard Mautner, a partner in the venture capital firm of Goodman and Mautner, Inc. of Los Angeles, agreed with Rider that a well-organized management team is an important consideration in evaluating new companies for possible funding.

In addition, Mautner decides whether to invest in companies with new technology by analyzing the marketplace, the product and the business plan of the company.

Mautner also assesses whether the people starting the venture have the entrepreneurial willingness to make a commitment to hard work. If the commitment isn't there, Mautner advised would-be entrepreneurs to "lie down and wait until the feeling passes."

Destroying Competition

Representing the other side of the dollar were Robert H.F. Lloyd, president of Conver Corp. of Cupertino, Calif., and Renn Zaphiropoulos,

founder of Versatec Corp.

Lloyd presented a scenario showing how an established company would engage in price cutting to destroy a new competitor.

First, the established company with a mature but profitable product will lop a little off its already healthy profit margin, hoping to stifle the newcomer.

New technology, Lloyd explained, is more vulnerable to attack if prices of the existing technology are dropping.

Further Trimming

After the first price chop, the company may decide to trim more fat by eliminating R&D and market research for the mature "dead" technology. In some cases, companies may cut prices even to the point of losing money for a particular product line for a certain period of time, relying on other company products to make up the loss.

This last-ditch effort, Lloyd claimed, is designed to drive the new company out of the marketplace. If the established company is successful in driving out the technologically superior product of the new company, the mature product will rebound and continue making money for the established firm.

"Your new product," Lloyd warned, "has to have two to four times the advantage over existing technology to outlast price reductions of competitors."

Versatec's Renn added to Lloyd's remarks, summing up the challenge as follows: "If the benefits to customers are not attractive with respect to price, most likely your business will fail."

tone 3

IS HIGH PERFORMANCE LOW OVERHEAD

TSO for VS1

CHECK THESE FEATURES

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface

- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO commands
- Enhanced 3270 useability
- Full ASCII terminal support
- No user swapping
- No TCAM
- No VS/2 overhead



tone
Software Corp.

Write for Details

11588 TRASK AVE.
GARDEN GROVE, CA
92643 (714) 636-8501



DISK CARTRIDGES

AND ALL
MAGNETIC
MEDIA

"The Quiet Cat in a Field of Tigers"



SYNCOM

Orchard Park, N.Y. 14127/716-662-2181

Government's Role Crucial Japan's 10-Year Effort in DP 'Extraordinary'

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — In the early 1960s, the Japanese government undertook extraordinary measures to close the 10-year technology gap that existed between the U.S. and Japan, according to Osamu Ishii of the Electrotechnical Laboratory in Tokyo.

In fact, with its sponsorship of the National Research and Development Program and the Super High-Performance Computer Development Project, the Japanese government has been largely responsible for making Japan today second only to the U.S. in the number of computers installed, Ishii said at a National Computer Conference session here recently.

Based on the technology developed under government sponsorship, he said, the major Japanese computer manufacturers all introduced third-generation computers for commercial applications by the end of the '60s.

Another major milestone for the Japanese computer industry, also promoted by the government, was the reorganization of the six domestic computer manufacturers into three groups, with each group developing a new computer series.

The Fujitsu-Hitachi group developed the M series; the Nippon Electric Co.-Toshiba group, the Acos series; and the Mitsubishi-Oki group the Cosmo series. Ishii indicated that each of the

groups had completed all models of its series by the spring of 1977.

Ishii also noted that unlike the U.S. industry, the Japanese computer industry was started by telecommunications equipment manufacturers as opposed to business equipment manufacturers. In addition, the Japanese were able to bypass vacuum tube systems, moving directly into solid-state computers.

Today the Japanese have built large-scale integration and packaging technology, IBM compatibility, virtual storage, multiprocessing capabilities into their latest generation computers, Ishii said.

The three new series roughly correspond to the performance scale offered by the IBM 370. Originally, the cost/performance of these series surpassed that of the IBM 370. However, Ishii said that when IBM cut the price of the 370 and announced the Series 30 pro-

cessors in 1977, the situation changed.

Future technology advances stressed by the Japanese, according to Ishii, are systems architecture and very large-scale integration (VLSI). In addition, the Japanese are attempting to overcome input/output difficulties connected with "Kanji" — the ideographic portion of the Japanese language.

The systems architecture effort is geared to reducing system overhead caused by huge amounts of supervisor processing for multiprocessing control and high-level language statements.

The VLSI project, Ishii explained, is under the support and guidance of the Ministry of International Trade and Industry. Production and process techniques for submicron patterns using electron-beam, X-ray and conventional photo-lithography are being developed, Ishii said. Between 1976 and 1979 the government expects to invest more than \$233 million in this project.

Japanese Language Poses Problems Involving I/O

ANAHEIM, Calif. — One of the difficulties Japanese computer manufacturers are trying to overcome is developing input/output devices to handle "Kanji," the ideographic portion of the Japanese language, according to Osamu Ishii of the Electrotechnical Laboratory in Tokyo.

The Japanese language is usually written in a mixture of Kanji and "Kani" (phonetic) characters. There are only 48 phonetic characters. However, the Japanese commonly use 2,000 to 3,000 Kanji characters and often use as many as 10,000 of

these ideographs, Ishii explained at a recent National Computer Conference session here.

Because the Japanese language is not adaptable to a purely phonetic writing system, Kanji is an essential means of communication. Most computer systems in Japan today are not powerful enough to handle Kanji because of the lack of suitable input/output devices.

Input is a more difficult problem than output, Ishii noted, because of man-machine interaction. A Kanji typewriter has many keys because of the number of character sets.

Designer Explores Impetus Behind Development of 370

By Howard A. Karten
CW Staff

ANAHEIM, Calif. — The motivation for developing the IBM 370 came mainly from two sources, according to IBM computer architect Andris Padegs: the experience with 360 architecture and the rapidly declining cost of technology in the late 1960s and early '70s.

During a recent National Computer Conference session here, Padegs, who is said to be one of the few designers still at IBM who was involved in the design and architecture of the 360, described four critical constraints in the design of the 370:

First, any valid 360 application program had to run, unmodified and successfully, on the 370.

Second, the 370 had to be able to run 360 operating systems. It also had to be able to operate 360 I/O devices and, finally, it had to preserve open-endedness and design generality to keep the way clear for follow-on products.

Within these constraints, Padegs added, the 370 design had four objectives: to improve reliability, availability and serviceability; to boost the precision and predictability of the system; to enhance the performance of application programs; and to provide additional functions for operating systems.

One key to achieving these goals, the designer said, was frugality and control in allocating resources on the 370. Thus, requests for additional basic assembler instructions, for example, were appraised using what IBM calls a "figure of merit."

Defined as the relationship between the change in value to the change in cost, this figure was one of the keys in deciding whether or not to add a new instruction. Other considerations were also applied to requests by IBMers for changes, such as the effect of the changes on CPU size, expected usage estimates for new instructions and the expected ease of integrating the new instructions.

Acknowledging that there were in fact some incompatibilities, Padegs told the large audience that these were limited to programs operating in privileged mode, so did not affect typical application programs.

Four main incompatibilities between the two systems were found, according to Padegs. These were the use of the Ascii-8 bit in the program status word; the addition of a new operation code for halting an I/O device; the addition of a new function called command retry, used in an I/O channel; and the fact that removing power from the system caused a clearing of storage.



Announcing A New On-Line Systems Management Tool For The OS/VS1 User

- ☒ Real-Time Job Statistics
- ☒ On-Line Catalog, VTOC and Library Maintenance
- ☒ Real-Time System Debugging
- ☒ Real-Time Graphs on System and Hardware Utilization
- ☒ On-Line Data Management Facilities
- ☒ Comprehensive Text Editing

An invaluable systems management tool for the systems programmer to support Data Center operations, production control and other key operating areas.

Value Computing Inc.

The Computer Operations Company

Please send me more information about the On-Line Systems Maintenance Tool.

NAME _____ COMPANY _____
TITLE _____ PHONE _____
ADDRESS _____ CITY _____ STATE _____
ZIP _____ CPU _____ OPERATING SYSTEM _____

Mail to: VALUE COMPUTING INC. Or call toll-free
300 VCI Building, W. Marlton Pike
Cherry Hill, New Jersey 08002 **800-257-8242**



**COMPUTER TAPE
AND ALL
MAGNETIC
MEDIA**

"The Quiet Cat in
a Field of Tigers"

SYNCOM
Orchard Park, N.Y. 14127/716-662-2181

PCC Chief Sees Billion-Dollar Personal Marts

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — The home computer and the very small business system (VSBS) markets will become the billion-dollar sectors of the personal computer market — the VSBS now and the home market in the late 1980s — Ryal R. Poppa, president and chief executive officer of Per-tec Computer Corp. (PCC), predicted recently.

Speaking at a special personal computing luncheon at the National Computer Conference here, Poppa said that in the last six months, significant trends have developed in the personal computer market. Poppa especially pointed to the clarification of market segments which in turn portend an industry shakeout and to the growth of what he called a "Kelly Girl" programming and systems design approach.

Because there is so much confusion surrounding the term "personal computer," Poppa defined personal computers as "work enhancement tools, not major capital goods that have to be maximized in utilization."

Drawing an analogy, the PCC chief likened the personal computer to the office telephone 50 or 60 years ago. "It was very typical to have one telephone stand in the middle of the office for everyone's use. You would wait your turn to use the common telephone, as it was not personal. Small computers are going to become personal in nature — we'll have one for each person."

Four-Sector Market

Poppa divided the market into four major sectors: hobby, home, personal computing and VSBS. Summarizing the hobbyist sector, he said wryly, "A hobbyist is happiest when his machine is not working."

Defining the hobbyist market as composed primarily of people who build from kits, Poppa indicated that market is approaching saturation and said PCC will ship its last kit this month.

By explaining that if the computer is used as a work enhancement tool, it is a business system, Poppa essentially eliminated the personal com-

puting sector. "Personal computing will be a relatively small market segment because most computers today have some form of business payoff," he added.

Concentrating on the other two sectors — home and VSBS — Poppa entertained the predominantly male luncheon audience with a tape recording of a computer supposedly talking to an affluent suburban housewife and advising her of the critical tasks for the week — tennis matches and hair appointments among them.

Cost is the major limitation on the home system now, Poppa said. However, he

added, a second, potentially more constraining factor is that building codes and related insurance law "do not contemplate the type of transducers or electromechanical actuators wired into the home that will permit a home to be run by computer."

The home computer market will not be developed by firms like PCC or Apple Computer, Inc., Poppa said. "Rather, these markets will be developed by the Honeywells, the Westinghouses, the Nutones and perhaps even IBM," the PCC president predicted.

The VSBS is the major market now, Poppa claimed, not-

ing that it will grow substantially during the 1980s. He divided that market into three sectors.

The "stand-alone," independent small business with an annual volume of less than \$3 million is the hottest sector right now, he said.

A third sector, the departments of large businesses, is similar to the second segment and one Poppa sees developing rapidly because of its proximity to the main computer center.

Turning to the trends in the marketplace, Poppa forecast a shakeout in small companies that entered the microcom-

puter field. By the early 1980s, he predicted, "we will be down to less than 50 firms of any substance."

The maturing of the computer store, with the most successful ones becoming local business equipment stores oriented to the office of the future, was also cited by Poppa as a significant trend.

The computer store will further contribute to the shakeout among the small independents, Poppa contended, because they will begin to limit their inventory to two or three manufacturers, thereby shrinking the total market size for the smaller companies.

Announcing Control Data's Multifunction Terminal, new for stand-alone and distributed processing

Larry Eaton
General Sales Manager
Miniperipherals/Terminals Division



There are dozens of terminal manufacturers. And hundreds of models offered. But only a handful of companies offer a powerful user-programmable intelligent terminal that can operate both as a stand-alone processor and as a remote station for your IBM 360/370.

We call it a Multifunction Terminal because it can do so many things. Forms generation and entry. Accounts receivable or payable. Data entry. Inventory control. Inquiries. In a stand-alone mode or as a remote station.

We designed it to be easy to use. Our interactive forms language "coaches" non-technical personnel. And your more technically-inclined employees will appreciate the features of our advanced and business-oriented BASIC.

Extensive diagnostic programs are built into the terminal. Most are entirely automatic—a ROM-resident diagnostic executes on power-up and system-reset to check processor, memory and path to the flexible disk. Other built-in diagnostics provide more comprehensive memory and communications tests.

The final diagnostic works with an online test residing in the host processor.

Benefit from Control Data's experience

More than 15 years in remote computing. More than 13 years of experience in human-engineering and manufacturing terminals. And we design and make not only the display station, but also the floppy disk drives and matrix printer.

More than 4,800 Control Data Customer Engineers in our worldwide maintenance organization support our products.

Control Data's Education Company offers training courses for all levels of your personnel. And our Professional Services Division offers consultation and programming for your applications.

Even financing for your terminal purchase is available through Control Data's financial subsidiary, Commercial Credit Company.

So look to Control Data to help you implement your distributed processing strategy. For more information on our Multifunction Terminal, call 612/482-4379.

GD CONTROL DATA CORPORATION

More than a computer company

165-II

With a DAT this is almost a 168! Machines available now. With tie-in leases to your 3033

COMDISCO
312-698-3000

41 Countries Represented Center Hosted NCC '78 Visitors From Abroad

ANAHEIM, Calif. — Reading name tags without appearing obvious seemed to be a favorite pastime at the recent National Computer Conference here.

Some readers spotted attendees wearing name tags with official-looking blue ribbons displaying the words "International Visitor" who took in the exhibits and ate hot dogs, just like the rest of the more than 57,000 NCC '78 visitors.

The central meeting place for these foreign visitors was the International Center, a large, softly lit room off a quiet cor-

ridor of the Anaheim Convention Center.

Harry Costa and Anton Post, two Dutch visitors relaxing at the center, work for CSR, a remote computing services firm in Amsterdam. They were at NCC looking at minicomputers to replace a mainframe.

Costa and Post complained that NCC, unlike the Hannover Fair in Germany, was very congested — too many people and exhibits in a small place. They were amazed, however, to find the exhibitors so helpful and easygoing in the midst of such a frantic atmosphere.

Too many lectures with too little descriptive information was another drawback, Post said. The Dutch visitors also said they thought it was rude when people walked in and out of sessions.

In another corner of the center, Yoshihisa Ito, a Japanese journalist, socialized and discussed business with other foreign visitors. Ito, a writer

with *Information Industries and Market News*, a Tokyo daily, was escorting a group of 33 people representing various sectors of the Japanese computer industry.

Although Ito's group spoke little English, he said it was here primarily to visit the Personal Computing Festival. Earlier, through arrangements made by the staff of the International Center, the Japanese visitors were given a special tour of California Computer Products, Inc.

Calcomp has two or three Japanese engineers, Ito said, which made the tour highly enjoyable for his group.

This is the first year the American Federation of Information Processing Societies (Afips) has sponsored the International Center. It was previously run by the U.S. Department of Commerce, but Dr. Jean Paul Jacob, the center's director, said that for various reasons the govern-

ment declined to sponsor the center this year.

Although it was difficult to obtain space for the hospitality center, the courtesy was necessary because Americans are always treated well at conferences abroad, according to Jacob, who is on the staff of both IBM's Research Division and the University of California at Berkeley.

Registration 'First Aid'

The most important function of the center, according to Jacob, is "providing first aid for registration pains." More than 200 foreign visitors waited in line for as long as 3-1/2 hours only to discover that their pre-registration hadn't come through. Jacob hopes Afips will have special registration for these attendees next year.

Aside from smoothing over registration pains, Jacob and his seven staff assistants were busy providing assistance with translations, lost passports, hotel reservations and instructions on how to use the telephones.

Jacob commented that foreign visitors had various reasons for attending NCC. "Some visitors were looking around to see what the competition is doing, some were here to get as much technical infor-

mation as possible short of unscrewing the back off the machinery and some were users making buying decisions."

Approximately 1,800 foreigners from 41 countries visited NCC this year, Jacob estimated, adding that nearly half of them registered with the center.

Among the visitors was a group of 10 scientists and engineers from Peking. The "unofficial" group was organized by a business consultant, Jacob stated.

The largest foreign contingent registered with the center was a group of more than 300 from Japan, Jacob reported.

Other well-represented areas were Canada (42), West Germany (48), Scandinavia (60) and Latin America (95). Visitors came from as far away as Australia, Kuwait, Malaysia and Nigeria, Jacob said.

Jacob did receive some negative feedback from visitors. Some felt the conference was too large, and a few Europeans expressed a distaste for the use of sexy female models to demonstrate products.

On the positive side, the visitors told Jacob they had never dreamed they could see so much in so little time under one roof.

Technical Overview of Control Data's Multifunction Terminal

Basic hardware comprises a keyboard display, one or two flexible disk drives and a matrix printer. Software includes an operating monitor, peripheral drivers, system job functions, system utilities, file manager, a forms language and BASIC.

Keyboard display. 2000 characters on 25 lines with 80 characters per line. Each character is generated from random-access refresh memory as a modified 7 x 9 dot matrix. Detachable keyboard.

Flexible Disk Subsystem. Consists of one or two drives that use standard single-side, double-density disks. Capacity is 0.5 Mbyte formatted storage per disk, 1.0 Mbyte total.

Matrix Printer. The optional printer accepts single or multipart paper, prints bidirectionally up to 132 characters per line at 70 lpm. Compressed print option.

Controller. A microprocessor-based controller in the display unit includes: ROM; up to 64 Kbytes of RAM; communications controller; peripheral controllers and keyboard display controller.

Forms Language. An extensive, operator-programmable forms language. Operator "coaching" appears on the CRT screen.

BAF: C Language. Business-oriented, with features like: 14 digits precision; sequential, indexed and index-linked file I/O; character strings of up to 255 bytes; variable identifiers of up to 6 characters.

Communications. The terminal communicates with a host processor using Binary Synchronous (BSC) communication protocol. The system provides for auto answer and auto disconnect to allow the system to be polled while unattended. Speeds of 1200, 2000, 2400, 4800, 7200 and 9600 bits per second are supported. Protocol-compatible with the IBM 2770, 3770 or 3780. EIA RS-232-C Interface.

CD CONTROL DATA CORPORATION

More than a computer company

Scientists From China Took in Show's Sights

ANAHEIM, Calif. — A group of 10 Chinese scientists and engineers from Peking visited the National Computer Conference here recently during a leg of their month-long U.S. visit.

The privately escorted visit was organized by Arne deKeizer, a New York-based business consultant who said he has had a long-time interest in commercial and cultural exchanges with China.

DeKeizer reported that the privately organized visit was sponsored by the Chinese Electronics Society for the purpose of allowing the scientists from the various Chinese

institutes to gain an overview of the American computer industry.

Private Group

As a private group, the Chinese were not available for an interview, he said. DeKeizer did not comment on the extent of U.S. government approval necessary to arrange the trip.

He did say, however, that he worked closely with the U.S. State Department and that the trip "was in the works a while."

The group will visit several computer manufacturers, deKeizer reported, but he did not indicate precisely what the Chinese scientists were interested in seeing.

DeKeizer noted that the general policy of both nations is to build relationships between the two countries with the expectation of increased opportunities for general technological exchanges.

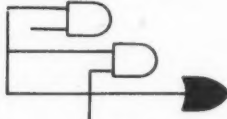
Acquisitions

The Summagraphics Corp. has agreed in principle to acquire the computer graphics product line of **The Bendix Corp.**

Intel Corp. has agreed to acquire **Delta Resources, Inc.** of New York City for 300,000 shares of Intel common stock.

Comshare, Inc. has acquired the business and certain assets and liabilities of **Valuation Systems Corp. (VSC)**, of Rolling Meadows, Ill., for an undisclosed amount of cash and notes payable. VSC is a consulting firm which specializes in services for replacement cost and current value measurement.

TSX



**RT-11 and CTS-300 TIME SHARING
Version 7: RT-11* V3 COMPATIBLE**

- Handles up to ten terminals.
- Runs on any PDP-11 with 20k words, program swapping disk, and line frequency clock.
- Supports FORTRAN, MACRO, BASIC, DIBOL, LINK, PIP, and EDIT.
- Automatic spooling to line printers.
- DL11, DLV11, and DZ11 support.
- Command file capability.
- Virtual time sharing lines allow one terminal to control multiple jobs.
- Optional log-on facility.
- User accounting.
- Device/file protection.
- Nested command files.
- New detached job feature.

\$1275 distributed on floppy disk.
\$1350 distributed on RK05 cartridge.
\$85 for updates.

s & h computer leasing, Inc.
suite 222
4004 hillsboro road
nashville, tennessee 37215
(615) 385-3875

*Trademark of Digital Equipment Corporation

SOFTWARE YOU SHOULD KNOW ABOUT

DASD CORPORATION: I'm interested in:

TRANSLATING


- ☐ RPG to COBOL (DOS or OS)
- ☐ SYSTEM/3 COBOL to OS COBOL
- ☐ DOS COBOL to OS COBOL
- ☐ GE MAP to OS COBOL
- ☐ 360/20 BAL to 360/370 OS ALC

TSO

- ☐ Increasing my capabilities with TSO with Video Programming Tools. VIP simplifies the creation and modification of data files and will automatically flow-chart JCL procedures.

CICS

- ☐ Saving 75% of my programming BMS coding time and automatically printing hard copy screen images with MAPGEN.



DASD CORPORATION
National Marketing
1480 Renaissance Drive,
Suite 315
Park Ridge, Illinois 60068
312/299-5005

PLEASE SEND DETAILED INFORMATION TO:

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

PHONE _____

why would a busy data processing professional GO TO GRADUATE SCHOOL ON SATURDAY?

To be better prepared for the challenges that come on Monday

Fairleigh Dickinson University announces a weekend program leading to an MBA in Management (For Data Processing Professionals). On the weekend, when the business world slows down, an innovative graduate business administration program revs up at Fairleigh Dickinson University in Rutherford, New Jersey. The program, open exclusively to experienced and academically qualified data processing profes-

sionals, leads to an MBA degree in two years of study on Saturdays.

Data processing professionals with at least five years' experience in the field, take courses in five-week modules. They progress through the program in a single group, beginning in September or February, completing three modular courses each semester.

For an application and more information, mail the coupon today. Or phone the College of Business Administration, Rutherford Campus, at (201) 933-5000, Ext. 210.

University Admissions
Fairleigh Dickinson University
155 Montross Avenue
Rutherford, N.J. 07070

Please send me an application and more information about the MBA in Management (For Data Processing Professionals).

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

BUSINESS PHONE _____

area code _____

HOME PHONE _____

No person in whatever relationship with Fairleigh Dickinson University, shall be subject to discrimination on the grounds of race, color, creed, sex, handicap, or national origin.

FAIRLEIGH DICKINSON UNIVERSITY

Florham-Madison, Rutherford/Wayne, Teaneck-Hackensack, New Jersey

"Introducing our shiny, new, high-performance systems software."

Is it worth the price?

When you're ready to change your system, choosing the right package can be tricky business. Up the speed and you up the cost. Lower the cost and you reduce capability. Where is the happy medium between performance and expenditure? Find out! In our July 31st supplement: *Systems and Utility Software*, edited by Brad Schultz. Featuring tutorials and applications stories as well as late-breaking news, we'll be concentrating on finding the best ways to cut the hidden costs of using and maintaining systems and utility software, especially in the area of:

- Resource allocation
- Program sequencing
- Merging/Sorting of Data
- Control of access
- Compilation

If you're an MIS executive, DP Manager, Supervisor or Programmer, you'll find our July 31st report especially valuable. If you market systems or utility products — your ad should be there. Closing date is July 14th. Or, to reserve space, call Terry Williams at (617) 965-5800.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston
Bob Ziegel
Ron Evans
Frank Collins
(617) 965-5800

New York
Don Fagan
Frank Gallo
Peter Seft
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 421-7330

Los Angeles
Judy Milford
Bill Healey
Jim Richardson
(213) 475-8486

CA Targeting End Users With Packaged Protos CPUs

ANAHEIM, Calif. — For the first time, Computer Automation, Inc. is selling directly to the end-user market with the introduction of its Protos general-purpose computer, Mike Saccomano, product manager for packaged systems for CA's Naked Mini Division noted here recently.

This is the first general-purpose, packaged, bundled system the firm has sold, according to George White, manager of special project development.

CA will only market the 128K megamini in more than single quantities to large users such as Dow Chemical Co. "We are aiming for the volume end-user market," White explained.

In particular, White said Protos is es-

pecially suited for multiprocessing, multiuser capability, with no environmental constraints.

The lack of a field service organization has been a major constraint in entering the end-user sector, Saccomano stated. Although the Naked Mini Division will offer limited field service for the product, the firm expects only a minimal demand for service because Protos will be purchased by sophisticated users who, in many cases, will be able to isolate and repair problems on their own.

CA expects to ship the \$100,000 Protos by the first of the year and, according to Saccomano, is aiming for sales of about 200 systems per year.

DEC Designates Distributor

BOSTON — Digital Equipment Corp. has designated Hamilton/Avnet, an electronics distributor in the U.S. and Canada, as its first authorized stocking distributor for DEC's LSI-11 microcomputer products, effective July 3.

Hamilton/Avnet will stock more than \$1 million worth of LSI-11 microcomputer modules and development systems. Demonstration equipment will be provided at each of its 36 stocking locations to give customers the opportunity to gain hands-on familiarity.

"As computer systems and their components become smaller and less expensive," Hamilton/Avnet president Tony Hamilton noted, "customers expect the same kind of off-the-shelf delivery that characterizes electronic components distribution."

Asked whether DEC will sell other products through stocking distributors, Ted Johnson, DEC vice-president of sales and service, replied that the company will do whatever makes sense to provide its customers with the best possible service.

Contracts

Informatics, Inc. has received a five-year, \$3.1 million contract from the U.S. Environmental Protection Agency for the design, implementation and operation of a computer-based information system to support the Office of Toxic Substances in carrying out the Toxic Substances Control Act.

Raytheon Data Systems has been awarded a contract valued at \$1.6 million from the U.S. Customs Service to install PTS-100 terminals in offices at major ports of entry throughout the U.S.

Recognition Equipment, Inc. has received a contract for six Trace credit card processing systems, with a purchase value of approximately \$5 million, from Analytical Computer Services, Inc.

Univac has been awarded \$4.98 million contract for a number of systems to form the Network Control Center Data System. This system will be used to control and monitor the worldwide communications network of the National Aeronautics and Space Administration.

Computer Sciences Corp. has received two follow-on contracts for systems engineering services from the U.S. Army Missile Research and Development Command at Huntsville, Ala. The estimated value of the three-year and one-year task ordering contracts totals more than \$4 million.

Bell Telephone Laboratories has signed a \$7.3 million contract with Honeywell Information Systems, Inc. for the purchase of two large-scale computer systems and for upgrading of existing equipment.

Computer Sciences Corp.'s Infonet

service will provide International Harvester Co. with time-sharing and related services throughout the U.S., Canada and Europe under a three-year contract valued at \$3 million.

The Pertec Division of Pertec Computer Corp. has been awarded a renewal contract by Compucorp, Los Angeles, for FD400 floppy disk drives to be used in the Compucorp Model 450 small business computer system and the Model 491 disk controller. The two-year contract is valued at \$200,000.

Valley Fidelity Bank and Trust Co. of Knoxville, Tenn. has signed an agreement with EFT Data Services, Inc. that will enable the bank to offer area retail merchants check verification/guarantee and credit card authorization services.

Rivtow Straits Ltd. has entered into an agreement with the Canadian Data Processing Corp. for services to be provided on Canadian's Data's IBM 360/40 and soon-to-be-installed Digital Equipment Corp. PDP-11/70 system. The PDP-11/70 is valued at more than \$250,000.

Canada Systems Group has been awarded a three-year agreement for DP report preparation by Collection Control (Central) Ltd. of Toronto.

The Harris Corp. has awarded a \$2 million subcontract to Canstar Communications, a division of Canada Wire and Cable Ltd. of Toronto, to supply and install the fiber optics cable and DC power subsystem for a 50-kilometer telephone communications link being furnished by Harris for Alberta Government Telephones in Alberta, Canada.

position announcements

position announcements

position announcements

position announcements

position announcements

POSITION ANNOUNCEMENTS

THE WAONE HAMMOND AGENCY
Executive Placement Service
and Contingency Search
Specialists in
Data Processing

"The Nation's Most Respected
Executive Personnel Service"
Ask Our Clients Why.

533 Airport Boulevard, Suite 500
Burlingame, California 94010
At S.F. Intl. Airport (415) 348-1535

DALLAS

Consulting company needs
Prog/Analysts, degree,
poise, maturity - to \$24K
IBM COBOL, manufactur-
ing, inventory - to \$20K
Process control Prog/Ana-
lysts (ALABAMA) IBM
Series 1, EDX, Fortran,
BASIC, degree - to \$20K
Suite 1109, Stemmons Tower W
Dallas, TX 75207 (214) 637-6360

FT. WORTH

Rapidly growing data proc-
essing market. Outstanding
climate and friendly peo-
ple. Small town environ-
ment with all the advan-
tages of urban life. Just 25
miles from Dallas!

Suite 911 One Summit Ave.
Ft. Worth TX 76102 (817) 336-4565

HOUSTON

Programmers to \$24K
Sys Analysts to \$28K

All skills, all industries

Suite 960 E. 4615 S.W. Frwy
Houston TX 77027 (713) 960-9102

KANSASCITY

COBOL Prog/Anal \$17-23K
Midwest locations
Sys Prog \$18-22K
MVS, TSO
Sys Prog \$19-20K
Univac, Exec 8
Insur P/A \$18-22K
370, COBOL/BAL

6405 Metcalf, Shawnee Mission
Kansas 66202 (913) 236-8288

TULSA

Excellent opportunity for
an experienced OS/MVS
Systems Programmer to
provide leadership in instal-
lation & support of IMS,
TSO, CICS. This beautiful
city of 400,000 offers su-
perior living conditions.
Salary to mid-twenties.

2624 E. 21st St. Tulsa OK 74114
(918) 747-3621

**DATA
PROCESSING
CAREERS**
Personnel Consultants

engineering

Design the Digital Telecommunications Systems of the Future!

The first steps have been taken here at GTE Automatic
Electric Laboratories.

**CALL TOLL FREE
(800) 323-1966**

In Illinois (800) 942-0491
Monday thru Friday from 8am to 5pm cdt

The real-time, computer controlled telephony process systems that are already on-line at GTE Automatic Laboratories, represent the state of the art in telecommunications, and in distributed processing digital systems. Our assignment: to conceptualize tomorrow's needs, and develop the systems to meet them . . . These are key ground floor openings:

APPLIED RESEARCH

Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment:

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

SYSTEMS DESIGN

New Feature Design - Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design - Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Schottky, TTL as well as Static and Dynamic MOS.

International Design - Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software - Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/I.

Support Software - Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software - Large scale development in telephone system real-time control Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with a challenging new frontier in computer technology, talk with us.

If unable to call, send resume including recent salary history to:

Manager of Technical Employment, Dept. 471 A6

**GTE AUTOMATIC ELECTRIC
LABORATORIES**

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

**Make
the
Switch!**

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMER

RCA Global Communications, Inc. has an immediate opening for a Senior Systems Programmer to support 370/148 VM installation.

We seek an individual with a minimum 3 years experience in COBOL and VSAM, and at least 2 years experience in VS 1. Familiarity with VM-CICS and TP network also desired. SYSGEN experience essential.

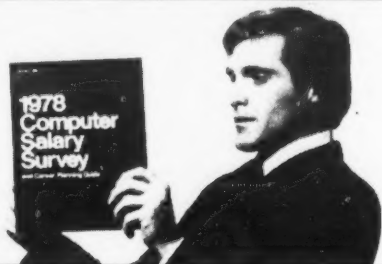
Position reports directly to the Manager of Information Systems Operations. Excellent starting salary and full range of benefits.

Please send resume and salary requirement, in confidence to: Ms. S. Krapf, RCA Global Communications, Inc., Box 11-WL, 60 Broad St., New York, N.Y. 10004.

We are an equal opportunity employer F/M.

RCA

1978 Computer Salary Survey!



Call for your Free copy today!

Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's 1978 Computer Salary Survey and Career Planning Guide lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advice on a variety of important career topics such as: when you should consider a job change; what you need to do to break into management; how to make sure you're getting the proper exposure; why timing is so crucial in your long range career development; how you can avoid stagnation... and much more.

The 1978 Computer Salary Survey has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

For your Free copy, call the Source Edp office nearest you.

East:
Boston 617/482-7613
Wellesley MA 617/237-3120
Hartford 203/522-6590
New York City 212/736-7445
Philadelphia 215/665-1717
Stamford CT 203/329-8411
Union NJ 201/687-8700
Washington DC 703/790-5610
Midwest:
Chicago 312/782-0857

Cleveland 216/771-2070
Detroit 313/963-0510
Kansas City 816/474-3393
Milwaukee 414/277-0345
Minneapolis 612/544-3600
Northfield IL 312/446-8395
Oak Brook IL 312/986-0422
Pittsburgh 412/261-6540
Rolling Meadows IL 312/392-0244
Southfield MI 313/352-6520

St. Louis 314/862-3800
St. Paul 612/771-0544
South/Southwest:
Atlanta 404/325-8370
Dallas 214/387-1600
Denver 303/773-3700
Fort Worth 817/338-9300
Houston 713/626-8705
New Orleans 504/561-6000

West Coast:
Encino CA 213/995-8866
Irvine CA 714/833-1730
Los Angeles 213/386-5500
Palo Alto 415/328-7155
San Diego 714/231-1900
San Francisco 415/434-2410
Seattle 206/454-6400
Torrance CA 213/540-7500
Canada:
Toronto 416/364-2919

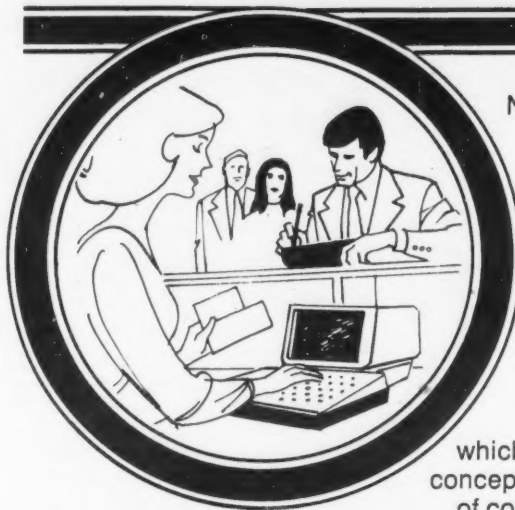
source  edp

If unable to call, write: Source Edp, Department C
721 Enterprise Drive, Oak Brook, Illinois 60521
(When writing, please be sure to use home address and indicate position title.)

- ELECTRICAL DESIGN ENGINEERS
- PROGRAMMERS/SYSTEMS ANALYSTS
- SYSTEMS ENGINEERS

Work with the people who have revolutionized the banking business: NCR-Dayton.

EDP Terminals for Financial Institutions



NCR business computer systems have changed the financial picture so radically that yesterday's bankers and financiers wouldn't recognize their businesses today. At NCR-Dayton, our part in that transformation is a lineup of financial terminals of such versatility and performance, they have made possible new banking and financial services which have motivated new marketing concepts for financial institutions. That, of course, opens up larger marketing potentials for us. And greater career potentials for you.

We're now designing new advances in EDP terminals with greater computing and communications power, to maintain NCR's leadership position in business and financial systems. To accomplish our objectives, we're enlisting the best of the field of electrical design engineers and programmer/analysts. If you'd like to join one of the computer industry's major companies, the one that has revolutionized the banking and retail businesses, we invite you to investigate these openings. We have opportunities at all levels... from trainees to project leaders in the areas listed below. BS in EE, CS, or related field is required, with or without experience. We'd like to hear from recent graduates.

Electrical Design Engineers

- Microprocessor Applications
- Digital and Analog Circuits
- Electrical Control Circuitry
- Terminal Peripherals

Familiarity with microprocessor programming helpful.

Programmers/Systems Analysts

- Microcomputers • Minicomputers
- Operating Systems
- Distributed Processing Systems
- Communications Software

Requires background with 8080 Assembly and COBOL language.

Also openings for: SYSTEMS ENGINEERS

...for development and analysis of banking system concepts and architectures including conceptual development and system design. Creation of system strategy and standards and analysis of existing systems to determine and improve effectiveness. Products include computer based banking controllers, communications systems, and teller/customer operated terminal devices. Five years experience in system design required. Knowledge of the operation of financial institutions, or financial systems development background and familiarity with minicomputer and microprocessor based control systems and related hardware and software desirable.

We offer an outstanding compensation and benefits package with a fine environment in which to work and live. Please forward your resume, indicating salary requirements, to:

Mr. Larry E. Combs, Engineering & Manufacturing-Dayton, Employment Dept. CW626, NCR Corporation, Dayton, Ohio, 45479.

NCR

Complete Computer Systems

position announcements

position announcements

position announcements

position announcements

position announcements

Programming Analysis

370/155, 168, 195, minicomputers, OS, MVS, DOS, IMS, CMS-VM

Good people have made Decimus Corporation a foremost leader in supplying Data Processing services to the Financial Industry. Several divisions within the Corporation are looking for the same kind of people — people who see our needs as a challenge and opportunity for their growth — to support a variety of business, financial and commercial applications. If you have either a minimum of 1 year in designing and writing COBOL and/or Assembler programs using OS or DOS and a demonstrated ability to test and implement assigned tasks, or a recent degree in Computer Sciences with equivalent Academic support experience, we'd like to hear from you. Knowledge of Librarian and NCSS, and experience with Banking/Financial Systems would be extremely helpful.

Salaries are commensurate with level of expertise/contribution; our benefit package (includes a dental plan and reduced loan interest rates. Resumes must include salary history or requirement to be considered, and may be sent in confidence to D.B. Michaels, Decimus Corporation, Suite 320, 1700 Montgomery St., San Francisco, CA 94111 (415) 622-2030. EOE, m/f/h.

Decimus

A BankAmerica Company

POSITIONS NATIONWIDE CALL TOLL FREE 800-426-0342

Mgr., Matr. & MFG. SYS. To 30K
Requires IMS, TP, MRP + Degree.
Mgr. Tech. Serv. To 28K
Two yrs. MVS, IMS, TP + Degree.
OS Cobol Progs To 22K
Need several. Openings from coast to coast.
Sys Programmers To 30K
IBM OS & CDC Internals exp.
Applic. Prog/Analysts To 22K
Openings are too numerous to list.

BILL ISGRIG
PARKER PAGE ASSOCIATES
P.O. Box 12308
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

Software Professionals: This may persuade you to join ADR...

The Company

ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed \$20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

The Products

ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

Openings for Systems Software Development

If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with on-line systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Please send your resume in complete confidence, including current salary and position desired, to: Director, Software Products Division. Or call 609-921-8550.



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS*

Route 206 Center, Princeton, N.J. 08540

An Equal Opportunity Employer

Programmers Analysts

Take advantage of the most individualized job search available in The D.P. industry today. You pay absolutely NO fee for our service. Send us your resume with present salary & geographic preference.



SEARCH E.D.P., INC.
3152 Linwood Ave.
Cinti, Oh. 45208

ALL YOU

EDP MANAGERS

Are YOU tired of the 9 to 5 Ivory Tower syndrome???

BREAK LOOSE and earn more dollars by selling computer ribbons.

YOUR sales earn high commissions full or part-time.

Call GREG (516) 931-3120

SAN FRANCISCO DP Trainer Positions Bank of America Hqtrs.

In-House programming instructors needed for the following areas: COBOL, OS-370, ALC, STRUCTURED PROGRAMMING, DESIGN and ANALYSIS. Salary commensurate with experience. Department #3411-Staff Development, 1455 Market St., San Francisco, CA 94137. Equal Opportunity Employer.

BANK OF AMERICA



OUR STANDARDS ARE HIGH THEY HAVE TO BE

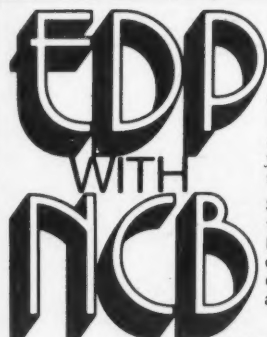
Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings including Miami, Houston, Washington, D.C., Baltimore and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mrs. Donna Koterba

Data Technology

6611 Kenilworth Ave., Suite 413
Riverdale, Maryland 20840
(800) 638-0911



We are Ohio's largest national bank. Our Data Processing division has more than doubled in size to over 150 people in five years. We are OS with four large IBM 370 systems.

Systems, Banking and Customer demands in the areas of Electronic Funds Transfer, Branch On-Line systems, Integrated Financial Services and EDP Auditing have created openings in both Banking and Financial applications for:

SYSTEMS ANALYSTS

(Project coordination and design of large on-line systems)

PROGRAMMER ANALYSTS

(OS, BAL or COBOL programming and design)

EDP AUDITORS

Analysis and design of security controls for new and extant systems)

All candidates must have a minimum of 2 years EDP experience in a large computer environment and any of the following qualifications: BAL, COBOL, OS/VS1-VS2, TP or CICS. Individuality and creativity is recognized and rewarded.

We offer excellent working conditions in a large, modern data center in the suburbs, but close to the Interstate, public transportation and shopping - market adjusted, realistic salaries and excellent benefits including profit sharing.

Join a stable, growing, profitable industry.

Send resume in confidence to:

Professional Employment Division

NATIONAL CITY BANK

4100 West 150th Street
Cleveland, Ohio 44135

We are an Equal Opportunity Employer, M/F

BURROUGHS PROFESSIONALS

Currently seeking programmers and analysts to fill immediate openings. If you are interested in exploring new opportunities, send your resume in confidence to:



SEARCH E.D.P., INC.
P.O. Box 8032
Cincinnati, OH 45208

SYSTEMS ANALYST

Progressive health care facilities seeks individual with at least 4 years systems experience. Experience in on-line development preferably utilizing CICS a plus. Ideal candidate will be responsible for original design of direct health care oriented system with time being distributed 85% systems and 15% programming. Our hospital operates a 370/138, DOS/VS, CICS VS system.

PROGRAMMER ANALYST

This challenging position involves heavy participation in original system design and all aspects of financial reporting. Minimum of 1 year programming experience installing package software and DOS/VS helpful. COBOL is a must.

Both positions offer a competitive salary and liberal benefits. In addition, time and one-half is paid for overtime.

Contact Personnel:

(312) 797-3229

MACNEAL

MEMORIAL HOSPITAL

3249 South Oak Park Ave.

Berwyn, Ill.
Equal Opportunity Employer

Manager Systems and Programming \$32,000 Range

Large Scale Mainframe User

For Confidential Consideration Forward Resume With Present Salary.

BRUCE A. MONTVILLE
MANAGING PARTNER
(603) 926-6712

Exeter Associates, Inc.

EXECUTIVE RECRUITING CONSULTANTS

BOX 623 COMPUTER PARK HAMPTON N.H. 03842

DATA PROCESSING

Major financial institution offers immediate openings for Senior Programmer Analysts, Programmer Analysts, and Programmers.

We utilize COBOL and Assembler languages in both conventional and IMS-based systems. Our operating environment consists of IBM 158's under BS.

We will consider individuals who are self-motivated, result-oriented professionals with proven records of accomplishment. We offer competitive salaries, benefits package and excellent advancement opportunities. Please send resume indicating position of interest, current salary and salary requirements to:

CHUCK DOWEL

UNION BANK

1000 So. Hope St.
Los Angeles, CA 90015
Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

HOW TO STAY

#



Florida Software Services didn't become the leader in the financial software field by hiring second rate people. We like winners. We like creative thinkers. And, we take care of them — with top salaries, the best benefits and a great Central Florida location.

Our business is providing application packages and data services for over 1000 banks worldwide. In addition, we operate seven computer centers serving the health care industry. Our rapid growth rate keeps us constantly on the lookout for sharp people in: Operations • Sales • Technical Writing • Product Marketing • Systems Analysis.

If you have the qualifications and the desire to be with the leader, let's get together. Send a resume in strictest confidence to our Personnel Director.

FLORIDA SOFTWARE SERVICES INC.
P.O. Box 2269, Orlando, Florida 32802

The standard in financial software programs.

SYSTEMS PROGRAMMERS

We have been retained by a prominent international organization to recruit 8 high calibre software professionals for their new Advanced Systems Development Group. These individuals will be part of a top notch team involved in state-of-the-art development work for their world-wide computer network using IBM's most advanced hardware and software.

A sample of current projects include:

- Interactive Software Development
- Modification & Enhancement to IBM Operating Systems Software
- Systems Generation, Maintenance & In-Depth De-Bugging
- Modification & Development of Network Configuration Software

Our client offers an exceptional opportunity for long term career growth in a stable but rapidly expanding environment. Management is both responsive and technically capable. They offer highly competitive compensation (\$20,000-\$35,000) with solid future earnings potential and clearly developed career paths in both the technical and managerial areas. They are situated in a pleasant suburban location near a major city and varied recreational areas.

Exceptional individuals at all levels are invited to explore these opportunities in complete confidence. All responses will be answered promptly. Please call us collect or write:

PAUL-TITTLE ASSOCIATES, INC.
8720 Georgia Avenue, Suite 900
Silver Spring, Md. 20910 (Agcy)
(301)-585-7600
Representing an Equal Opportunity Employer

Software Professionals

“the next 20 years will see nearly \$1 trillion invested in telecommunications”..

Business Week, February 13, 1978

To further enhance our position in this market, and to continue to meet domestic and international demands for our products, we have responded to this unmistakable surge in the telecommunication industry by creating a totally new organization. Solely dedicated to address the exploitation of technological breakthroughs in digital transmission systems, digital switching systems, and integrated voice-data systems, our course is clear — and the first order of business is to augment our organization by attracting the very best software professionals.

Our initial thrust is in the direction of designing and developing software for Toll and Central Office Exchanges, PABX's, the automation of Centralized Maintenance Centers, and Network Management concepts.

Given the opportunity to be one of the first to join this group, your potential personal growth is limitless. The teams are being formed now. The challenges are tremendous and the rewards are fulfilling. As a member of our software staff, you will utilize all the latest techniques for software development, including top-down analysis and structured programming, code walk-throughs, and the use of automated software development tools.

You will need a BS degree (MS preferred), at least two years of real-time programming experience and familiarity with languages such as PL-1, Assembly, ALGOL, or PASCAL.

If you have the talent, and a sincere desire for a once in a lifetime breakthrough in your professional career, send your resume and salary requirements to:

F.C. Brown
Sylvania Technical Systems - Atlantic Operations
140 First Avenue, Waltham, MA 02154

We are an equal opportunity employer, M-F.

GTE SYLVANIA

LOS ANGELES

Our clients in Southern California are seeking qualified candidates to fill a wide variety of excellent positions within their Data Processing departments. Starting salaries vary depending upon experience and specialty. Why not combine your vacation to our area with a few selective interviews? Please forward your resume well in advance of your trip. Please call Duncan White for a review of current openings. (213) 386-6805

ROBERT HALF PERSONNEL AGENCIES

3600 Wilshire Blvd. #1914
Los Angeles, Calif. 90010

Analyst/Programmer Management Consulting

Our firm, one of the world's largest international management consulting organizations, is expanding its U.S. operations and requires an analyst/programmer to design and develop engineering type applications for client companies.

Candidates must have 3-5 years experience in systems analysis and COBOL programming. Knowledge of COBOL programming for Data Base applications would be an advantage.

The successful candidate will have demonstrated the ability to work independently. This is an excellent growth opportunity with potential for professional career advancement.

Send chronological resume and salary history to

K. McCullough
Vice President
PA International
Management Consultants
200 Park Ave.
New York, N.Y. 10017

Australasia/Europe/U.K./Japan/S.E. Asia/U.S.A.

position announcements

position announcements

position announcements

position announcements

position announcements

MANUFACTURING CONSULTANTS

East Coast computer manufacturer is actively seeking two individuals to join a group of professionals in a planning function chartered to define computer hardware and application software requirements to meet the future needs to its customers in the manufacturing community. Worldwide.

COMPUTER AIDED DESIGN & MANUFACTURING CONSULTANT

This individual should possess the following background:

- Practical manufacturing experience, e.g. Production control manager Material manager
- Manufacturing application software, e.g. PICS/IPICS BOMP/DBOMP UNIS
- CAD/CAM exposure, e.g. APT Engineering graphics Graphic terminals
- Specification development, e.g. Manual systems Hardware systems Application software systems
- Managerial experience, e.g. Projects Budgets Data base orientation Marketing exposure

SENIOR MANUFACTURING CONSULTANT

This individual should possess the following background:

- Practical manufacturing experience, e.g. Production control Material management
- Manufacturing application software, e.g. PICS/IPICS BOMP/DBOMP UNIS
- CAD/CAM exposure, e.g. APT Engineering graphics
- Specification development, e.g. Manual systems Hardware systems Applications software systems
- Data base orientation
- Marketing exposure

Qualified individuals are invited to submit resume of education, experience and salary requirements, in the strictest confidence to:

CW Box 1562
797 Washington St.
Newton, Mass. 02160

An equal opportunity employer M/F

PROGRAMMERS Process Control

Increased business, plus the opening of our Systems Center in suburban Philadelphia has created a need for individuals with 2 to 5 years real time programming experience. The majority of our programs are written in assembly language and applicants should be familiar with interrupt structure, operating systems and data based concepts.

Duties involve the design and application of software for sensor based computer controlled systems for use in waste water treatment, electrical power generation and a wide variety of industrial processes.

If you qualify and are interested in joining an established leader in a growing industry... please send your resume, complete with salary history, to Mr. T.J. Haines, FISCHER & PORTER COMPANY, East County Line Road, Warminster, Pa. 18974.

FISCHER & PORTER 

An Equal Opportunity Employer, M/F

Look to
tomorrow
and find...

WANG

LABORATORIES, INC.

Software Technical Writers

WANG is looking for software technical writers to document our new state-of-the-art 2200VS computer system. We need people with the technical ability to understand the various facets of a modern computer system and the writing ability to explain them clearly and coherently to others. We offer plenty of growth potential and the opportunity to work in a creative, challenging environment where individual achievement is recognized and rewarded. Our requirements are:

- Knowledge of at least one high level language, preferably COBOL, BASIC, or RPG II. (Knowledge of an Assembler language would be a plus.)
- Familiarity with a major computer operating system
- 1-3 years experience documenting or working with system software (programmers with a flair for writing are invited to apply)
- The initiative and creativity to follow a project through from initial research to final copy.

If you meet these requirements, we'd like to talk with you.

Senior Customer Training Specialist - Computer Systems

A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:

- Who is creative and self-starting
- Who has at least 3 years experience in the following areas:
 - Instructional experience in hardware and/or Operating Systems to Customers. Prefer Virtual Storage Systems
 - Knowledge of interactive and time sharing systems
 - Field Experience as a Systems Analyst/Programmer with applications knowledge
 - Excellent programming experience in RPG II and COBOL.
- Who has excellent communications skills.

If you have the experience and are interested in this growth position, we want to speak with you.

Sales Training Specialist - Computer Systems

The Education Center has a rewarding and challenging opportunity for a person who has been successful in sales and has the ability to train salespeople in product and skills. This is a highly visible position which requires a person to have:

- A minimum of 3 years of computer sales experience, preferably with knowledge of transaction and interactive computer systems
- The knowledge and ability to relate hardware and operating system features to the sales force
- Successful sales skills knowledge
- The ability to communicate well with all levels of management
- Excellent writing skills.

Additional requirements: College degree and training experience preferred.

Excellent salaries and earning potential plus superior company benefits. Please send resume including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG

LABORATORIES, INC.

One Industrial Avenue
Lowell, Massachusetts 01851

We are an equal opportunity/
affirmative action employer.

EDP AUDITOR

Prominent Boston financial services org. seeks sharp EDP Auditor for internal staff. Requirements include lge. COBOL business systems exp. & excellent customer interface skills. No travel. Excellent oppy. with an unlimited career path. Salary to \$25,000. Contact Gerry Battista (Fee Paid)

ROBERT HALF PERSONNEL AGENCIES

140 Federal St.
Boston, Mass. 02110
(617) 423-6440

DATA COMMUNICATIONS SYSTEMS ANALYSTS

Newly created key openings at various locations throughout the U.S. for Senior Systems Analysts with 3 or more years experience in data communications and BSC. Further experience with BTAM, TCAM, VTAM, or equivalent access methods helpful.

Salary, benefits and working conditions are excellent. Please call or send resume to:


CMC DIVISION

PERTEC
COMPUTER
CORPORATION

Don Hutchison
(213) 882-0030
Ext. 254 or 354
9601 Lurline Ave.
Chatsworth, CA 91311

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Senior Software Specialists

Our Systems Division has senior positions for experienced applicants in the following areas:

- N.C., Tool Design, Process Planning
- System Architecture, Data Base Management
- 3D Geometric Modeling
- Distributed Processing, Communications
- Graphics Applications

Gerber Scientific, long a leader in interactive graphics, has recently established a Systems Division to focus on the continued success and growth of this activity. These are key positions in the division offering excellent remuneration and fringe benefits.

Please send resume in confidence to:
Watson Peterson, Jr., Director of Personnel



Gerber Scientific Instrument Company

Systems Division

83 Gerber Rd.

South Windsor, Conn. 06074

An equal opportunity employer, M/F

COMPUTER CENTER MANAGER

Masters degree in computer science, data systems or related area and significant experience in management of administrative and instructional computer support services required. Salary commensurate with candidate's educational background and experience. Submit letter of application, resume and nominations by July 10, 1978 to: Dr. Robert C. Cloud, President, Lee College, P.O. Box 818, Baytown, Texas 77520. (713) 427-5611. An Equal Opportunity Employer.

PROGRAMMER/ANALYSTS

Accepting the challenge is your job... Providing the challenge is ours.

Challenging opportunities are available for professional programmer/analysts with at least six months experience... we're growing to make room for you.

Send resume to:
Informatics Inc.

1121 San Antonio Road
Palo Alto, CA 94303
Equal opportunity employer

SYSTEMS SOFTWARE PROGRAMMER

Expanding technical support staff in a San Francisco Peninsula location needs a self-motivated individual w/the following qualifications: SYSGEN exp. in MVS or MVT in a single or multiple CPU environment. MVS or MVT maint. experience 3-6 yrs. Systems Programming experience incl. 2 yrs TSO exp. knowledge or MVS internals helpful. Willing to accept MVT experience and retrain. Excellent benefits. Salary range from \$21K to \$29K. Send your resume and salary requirements to this paper ad: CW Box 1560, 797 Washington St., Newton, Mass. 02160. An Equal Opportunity Employer, M/F/H.

FACULTY POSITION

Instructor or assistant professor teaching data processing, business information systems, COBOL, and RPG beginning August 21, 1978. Masters degree necessary. Send resume, transcripts and three letters of recommendation immediately to Dr. Robert A. Dager, Head, Division of Business, Northeast Missouri State University, Kirksville, Missouri 63501. An equal opportunity/affirmative action employer.

DP MANAGER

Position reports directly to Controller of med. size div. of major Central NYS mfr. Resp. will include project mgmt. from inception to implementation. Sophisticated Sys. 3 disk equipt. Oppty. for diversification into mfg. & financial mgmt. PICS & MRP sys. a plus. \$22,000. Contact P Siegal. (Fee Paid)

ROBERT HALF PERSONNEL AGENCIES

1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202
(716) 842-0801

COMPUTER & MANAGEMENT SYSTEMS SPECIALIST

Prominent Washington-based natl. trade assn. requires leader to conduct member activities in mgt. science and manufacturing control areas. Must be degreed. Min. 5 yrs. computer applications exper.; RPG II exper. helpful. Writing and documentation abilities a must. Should be aware of and able to convey significance of developments in computer field. Exciting work in a growing, enthusiastic environment. Salary upper \$20's. Send resume and salary desired in confidence to: Graphic Communications Computer Assn./PIA, 1730 N. Lynn St., Arlington, VA 22209.

DATA PROCESSING OPPORTUNITIES

To keep pace with Mobay's rapid growth, our Information Systems Department is aggressively seeking talented professionals with the following qualifications:

Systems Analysts

A degree and previous experience in the development of large scale financial and manufacturing systems. Data Base or CRT oriented background is desirable.

Programmers

Minimum two (2) years background utilizing ANS Cobol in IBM OS/VS environment. Knowledge of IMS, structured and on-line programming is helpful. A degree is desirable.

These positions are available at our Headquarters Facility, located near Pittsburgh, Pennsylvania and offer ample opportunity for career growth in a state-of-the-art environment.

Our compensation package which includes company paid benefits with relocation assistance reflect Mobay's position as an industry leader.

Please forward resumes with salary history to: Personnel Department.



Mobay Chemical Corporation

Penn Lincoln Parkway West
Pittsburgh, PA 15205

We are an Equal Opportunity Employer
M/F/Handicapped

COMPUTER PROFESSIONALS

Interactive Graphics

Duties include design and development (hardware and software) of interactive graphic systems including data management techniques and minicomputer systems. Emphasis will be to enhance the man-machine interface. Minimum three years experience with M.S. in Computer Science or Electrical Engineering desired.

Data Base Management

Duties include development of data management techniques emphasizing distributed data bases and interactive techniques for data analysis on minicomputer systems. Minimum three years experience with Ph.D. in Computer Science desired.

Systems Software for Minicomputers

Duties include design and development of innovative systems software from both a high level system concept viewpoint to detailed device handler implementation. Large scale PDP-11 IAS/RSX experience desired. Minimum of three years experience with M.S. in Computer Science or IEEE.

Opportunity for professional advancement is excellent for those having good communication and leadership skills. The positions offer challenging work in a diversified research laboratory environment. Send confidential resume stating specific position in which you are interested in confidence to E.P. Galbraith

An Equal Opportunity Employer M/F



Battelle

Pacific Northwest Laboratories

Battelle Boulevard

Richland, Washington 99352

SYSTEMS OPPORTUNITIES

Growth of Dixico Incorporated, a Dallas based, diversified, international manufacturing company, enjoying a 30% growth rate, is resulting in major expansion of its management systems group.

Excellent growth opportunities, utilizing distributed data processing, are available in Dallas, Los Angeles and Connecticut in design development and administration of multiple, geographically dispersed computer-based systems.

You must have experience in design and project management related to manufacturing, financial and general business systems with data communications, and interactive processing in a distributed environment.

Explore this opportunity by sending your resume, including accomplishments and salary history to

Dick Atkins
DIXICO Inc.
P.O. Box 225116
Dallas, Texas 75265
Equal Opportunity Employer

DIRECTOR, DATA PROCESSING

Toledo, Ohio Financial Institution seeks experienced management to direct Data Processing Department. Company about to undertake major hardware/software/application expansion. Current environment includes 370/138 DOS/VS, CICS, DL/I. Preference given to candidates with:

- IBM 370 Management Experience
- Strong Management Skills
- College Degree or Equivalent
- Prior Insurance or Financial EDP Experience
- Excellent Communications and Human Relations Skills
- Knowledge of Long-Range Planning Techniques

This is a growth position. Excellent Fringe Benefits. Salary commensurate with abilities. Send Resume and salary history to Personnel Department, P.O. Box 943, Toledo, OH 43656. Equal Employment Opportunity and Affirmative Action Employer.

Data Processing Manager

We are a large CPA firm seeking a Data Processing Manager for one of our clients, a small, independent sporting goods manufacturers in Northern New Jersey.

This newly created position is necessitated by the rapid growth of our client and presents an unusual growth opportunity. Plans are for greatly expanded computer capacity to be brought in-house.

The position will entail conversion responsibility and subsequent system operation and maintenance. Extensive programming will be required, therefore COBOL and RPG experience is a must.

Send resume and salary requirements, in strictest confidence to: P.O. Box 277, Department CW, FDR Station, New York, N.Y. 10022.

DIRECTOR OF DATA PROCESSING

A major company located in an ideal Southwest city has an immediate need for a Director of Data Processing. The successful candidate will have a minimum of 4 years experience at the manager or director level. Strong organizational ability combined with proven communication skills at all levels of management including user staff personnel are qualities needed to be successful. Staff consists of 18 people, including 9 professionals.

Starting salary and benefits are excellent, but are secondary to the levels of respect, reward and achievement open to you in this select environment. Send your resume specifying current salary level and requirements to:

CWBox 1599
797 Washington St.
Newton, Ma. 02160

Equal Opportunity Employer M/F

TEBOL PROGRAMMER

MAJOR INTERNATIONAL PETROLEUM COMPANY, located in midtown Manhattan, offers challenging position at corporate headquarters for an experienced TEBOL programmer. An excellent opportunity for creative utilization of State of the Art techniques.

Applicant must be aggressive, self-motivated and have ability to communicate effectively. Requirements include a bachelors degree and 2-5 years data processing experience with a minimum of 1 year programming using TEBOL and OS JCL.

We offer excellent growth potential, competitive salary and comprehensive benefits. Please forward detailed resume, in strict confidence, including salary history to:

CW Box 1561
797 Washington St.
Newton, MA 02160

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Design & Development Engineers

General Electric has opportunities in the

Software Development Engineers

Join us and you'll be involved in developing software systems for on-line real-time applications in an industrial process control environment. Responsibilities will span system conception, systems design and diagnostic tests, system architecture, and hardware/software trade-off. Senior and project leader positions available.

Requirements: A BS/MS in EE or Computer Science or equivalent.

Circuit Design Engineer

Develop advanced electronic circuits, both analog and digital, signal or power. Will design small subsystem modules including microprocessors, input/output electronics and data buses. Requires BS/MSEE with experience in related development and design work.

We'll provide fully commensurate salaries and comprehensive GE benefits including relocation assistance.

Roanoke Valley... of Virginia.



Few areas of the country can rival the scenic beauty and comfortable lifestyle of the Roanoke Valley.

Find out more by sending your resume and salary history to: Mr. Thor Trolsen, General Electric Company, 1501 Roanoke Blvd., Salem, Virginia 24153.

GENERAL ELECTRIC

An equal opportunity employer, m/f

BUSINESS SYSTEMS ANALYSTS

Telemed Corporation, a leader in the fast growing automated health care industry, has immediate openings for talented, committed professionals to serve as analysts within the Information Systems group. These analysts must have a strong applications background and be able to take a project from start to finish, including definition, design, programming and implementation. Knowledge of COBOL is essential; background in data base systems and experience with the DEC System 10 would be an added plus.

Telemed provides a challenging and stimulating environment for professional growth, with the latest in computer technology and information systems. Business applications development is done on an in-house DEC KL-10 Timesharing system, with your own CRT for on-line program development. These positions offer an opportunity to interface with top corporate management and propose solutions to real problems. Salary will be commensurate with your background, experience and potential contribution to the company.

Send your resume or a letter detailing your experience, in complete confidence to:

Software & Professional Recruitment Center

TELEMED
CORPORATION

2345 PEMBROKE AVENUE
HOFFMAN ESTATES
ILLINOIS 60195

An equal opportunity employer

CUSTOMER ENGINEER UNIVERSITY OF WYOMING

Candidate must have 2 years Microdata experience, 3 years general computer maintenance plus some knowledge of communication and peripheral equipment. Travel is required to junior college sites throughout the State of Wyoming. Reply by July 1, 1978 to Personnel Office, Box 3422 University Station, Laramie, Wyoming 82071. The University of Wyoming is an affirmative action, equal opportunity employer.

Programmers, Analysts, Software Specialists

We are Specialists Too!

We can put you in touch with openings from coast to coast regardless of geographic preference. Contact the nearest NPA affiliate listed below for confidential service. All fees employer paid.

CAREER SPECIALISTS, INC.
4600 El Camino Real, Ste. 206
Los Altos, CA 94022
(415) 941-3200

COMPUTER CAREERS INC.
Specialists-DB
4720 Montgomery Ln. #503
Bethesda, MD 20014
(301) 654-9225

D. BROWN & ASSOCIATES
Dorothy Spiegel
DP Specialist
610 S.W. Alder, Suite 711
Portland, OR 97205
(503) 224-6860

SUPERIOR RESOURCES
16400 Ventura Blvd.
Encino (L.A.), CA 91436
(213) 986-4400

EXECUTIVE SALES PERSONNEL, INC.
Bill Ingersoll
222 S. Meramec, Suite 203
St. Louis (Clayton) MO 63105
(314) 863-5958

Over 200 members
in 135 metro areas

National Personnel Associates®

Sales Engineer Microprocessor Development Systems

Openings in Boston & Philadelphia.

Experience as a design engineer, applications engineer or sales engineer working with minicomputers, microcomputer systems or microprocessor systems will provide you the opportunity to join the Tektronix sales team.

We need professionals with hardware, software and microprocessor experience. Product and sales training will be provided for you.

Applicants should have a current knowledge of digital hardware systems and assembly language programming experience. In addition, a strong interest and aptitude in customer oriented sales is necessary. BSEE or equivalent is desirable.

Competitive salary program includes incentive compensation. Benefits programs include a substantial retirement plan.

Call George Evans toll free at 800-638-4052, or send complete resume to TEKTRONIX, INC., 2 Research Court, Rockville, Maryland 20850.

An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

LEEDS & NORTHRUP

The Careers: PROGRAMMERS AND SOFTWARE MANAGEMENT



The Experience:

**FORTAN
ASSEMBLY
MINICOMPUTERS
MICROPROCESSORS**



The Opportunities:

**DEVELOPMENT
APPLICATIONS
SYSTEM DESIGN
MAN/MACHINE INTERFACE
COMMUNICATIONS
SUPPORT PROGRAMS**



The Company:

LEEDS & NORTHRUP

An international leader in energy management computer systems.

To investigate your career with an established growth company call anytime 24 hours a day including Saturday and Sunday (215) 643-2000, Ext. 8762 or send your resume to: Jim Henderson, Manager of Professional Employment, Systems Group, Dept. C-26



LEEDS & NORTHRUP

Dickerson Road—North Wales, Pa. 19454

Equal Opportunity Employer, M/F/H

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMER

New position with full responsibility for all systems programming including DOS/VS, interactive programming and system tuning on our IBM 370/135 system. Salary starting at 15K with 21 days vacation and other excellent fringes. Applications received by June 30, 1978 guaranteed consideration. Contact Personnel Office, Moraine Valley Community College, 10900 S. 88th Ave., Palos Hills, IL 60465 (312) 974-4300. Equal Opportunity, Affirmative Action, Title IX Employer.

PROGRAMMER

Expanding facilities for new on-line applications creates this position, requires COBOL and some CICS applications. Equipment is 370/125.

Kingsbury is the leader in special purpose machine tools. Excellent location, pay, and benefits including flexible working hours.

Send job and salary history to:

Roger W. Hetherman
KINGSBURY
MACHINE
TOOL CORP.
90 Laurel St.
Keene, NH 03431

PROGRAMMERS

MIDWEST

Current openings for programmers with 1-2 years in Cobol in IBM environment, CICS or IMS a plus. Salary 15-19K. Send resume in confidence to:



SEARCH E.D.P., INC.
P.O. Box 8032
Cin., OH 45208

Systems Analysts Programmers

If responsibility, career advancement and personal recognition are your objectives...

WE COULD EXCEED YOUR EXPECTATIONS

We are an international public accounting firm expanding our computer auditing research and development staff. Excellent career opportunities are available for data processing professionals who desire challenging and diverse assignments.

Positions are currently available at our New York City headquarters for bright, ambitious, highly motivated individuals with the following skills:

- **COBOL**
Minimum of 4 years programming and systems analysis experience. At least 2 years of COBOL programming.
- **MINICOMPUTERS**
Minimum of 4 years programming and systems analysis experience. At least 2 years experience on business applications involving minicomputers (e.g., DEC, Data General, Varian). Additional experience on small business computers (e.g., IBM System/3) is a plus. Working knowledge of RPG. Working knowledge of COBOL.

A successful candidate will have a college degree, plus the ability to interact and communicate effectively.

Please submit your resume, including qualifications and salary history, in confidence to:

Mr. Lawrence N. Fein, Dept. 626CW (19th Floor)
277 Park Avenue, New York, N.Y. 10017

An Equal Opportunity Employer M/F

DIRECTOR OF DATA PROCESSING CENTER
(Anticipated) Master's in BDP or related discipline. Three years' experience in management/administration. Minimum two years' experience in programming and systems analysis. \$19,500 - 24,500. Effective August 1.

BUSINESS DATA PROCESSING ASSISTANT PROFESSOR

(Anticipated) Master's in BDP or related discipline; 3 years' BDP teaching and/or BDP industrial work experience. Effective August 28, 1978.

Send resume by July 12 to Jane C. Frank, Affirmative Action Officer, Berkshire Community College, Pittsfield, MA 01201
Equal Opportunity Employer

PACIFIC NORTHWEST

Our client, a leading manufacturer, is seeking several **SYSTEMS PROJECT LEADERS** who will design, implement and modify business systems needed for essential operations in rapidly expanding reorganization. We are seeking strong professionals with on-line systems experience primarily in manufacturing, financial or distribution applications.

TECHNICAL SUPPORT - seeking expertise in the following: IBM 370/OS/VS-1/MVS; TSO or VM/CMS; IMS;DL-1 and CICS. Individual selected will support new IBM installation.

Compensation and benefits are excellent. We also have career opportunities for analysts and programmers for manufacturing, banking and retail applications.

Call in confidence or send resume including salary history to: Al Friedman, (206) 455-8300, Executive Resources, Inc., 310 108th Ave. NE, Bellevue, WA 98004.

DIRECTOR of INFORMATION SYSTEMS

The Director will have overall responsibility for the planning, administration and control of the Information Systems group. With a staff consisting of thirty people, this group designs, develops and maintains automated university administrative systems.

Minimum qualifications include a Bachelor's Degree plus ten years of data processing experience; five years of management or administrative experience in a major data processing center, preferably at an institution of higher education; extensive experience at a working level in systems analysis and programming.

Salary level depends on qualifications, but minimum salary will be \$26,000.

Letters of application are requested by July 15, 1978, and should be sent to: William E. Walden, Associate VP for Computer Services and Information Systems, 2701 Campus Blvd., N.E., University of New Mexico, Albuquerque, NM 87131. An Equal Opportunity, Affirmative Action Employer.

Univ. of N.M. - June 26

PROGRAMMER ANALYST

WORK IN SUNNY SOUTH FLORIDA!

Candidates must have minimum 4 years experience as Programmer Analyst. Must be proficient in COBOL and BAL. Degree preferred.

This position immediately available on Florida's beautiful east coast. Year 'round fishing, boating, swimming and golfing. Excellent pay and fringe benefits. Send resume in strict confidence to:

Employment Supervisor
PIPER AIRCRAFT CORP.

P.O. Box 1328
Vero Beach, FL 32960

An Equal Opportunity Employer M/F

PIPER

DATA BASE SYSTEMS ENGINEER

Immediate opening in a data base systems support group working with DMS-1100 and QLP-1100 installed on a UNIVAC 1100-42 state computer center system. Position requires degree plus 2-4 years experience. Additional experience can substitute for college education. EXEC 8 and DMS-1100 experience highly desirable.

Send resumes to: Bobbie Hughes

Dept. of Computer Services
618 8th St. Office Bldg.
Richmond, VA 23219

EOE/M-F

SYSTEMS PROG

Major firm offers growth opportunity to indiv with CICS Assembler bkgd from lg 370 ship \$22K+DOE

SYSTEMS ANAL

You will coordinate lg teleprocess network if you have IBM Assembler TCAM bkgd \$26,000

Many other Prog, Prog Anal, Syst Anal and mgmt positions avail for EDP pros seeking upward move. All fees/exp paid by client cos. Reply in strict confidence

SHS INTERNATIONAL

1401 Cedar Crest Blvd
Allentown, Pa. 18104
K Molnar (215) 437-5551 Agcy

BUILD YOUR OWN STAFF

Salary Area \$27,000

Our client, whose revenues have tripled in the last four years, has decided to convert to fully on-line systems. This position will report directly to top financial officers and will be responsible for tripling the size of the present data processing staff. The company is headquartered in an attractive suburban Houston location and has unusual growth prospects. For further information, please contact Data Processing Specialist, Tom Fischer at (713) 658-9898.

All fees assumed by Client Companies

M. David Lowe
PERSONNEL SERVICES

403 Houston Nat. Gas Bldg.
1200 Travis St.
Houston, TX 77002

Software Engineers

Opportunities For Engineers, Systems Analysts With SEL RTM O.S. Experience in North Suburban Pittsburgh

We have immediate openings for individuals with SEL 32 (SEL 86) RTM knowledge and skills. The responsibilities of the positions include providing RTM support, enhancement, and extensions for Westinghouse SEL 32 real time process control systems.

Positions require 3-7 years experience and operating system skills. An Engineering degree is recommended.

These are outstanding career positions offering an excellent income commensurate with your experience, a generous company-paid benefits package and outstanding opportunities for professional achievement and personal growth.

As a member of the Software Development group, you will be working with application engineers, providing consultation on RTM capabilities and producing RTM extensions needed for process control systems dealing with energy management, industrial processes and manufacturing systems. Openings are also available in these application departments for qualified individuals with RTM experience.

For immediate attention, please send your resume, including salary history to: Abe Abrams, Personnel Relations Administrator.

Industry Systems, Division, Dept. CW, 200 Beta Drive, O'Hara Township, Pittsburgh, PA 15238.

An Equal Opportunity Employer M/F.

Westinghouse

position announcements

position announcements

position announcements

position announcements

position announcements

MIS MANAGER

- * Major Division of a Fortune 500 Corporation
- * Outstanding mid-Atlantic location
- * Long-term growth business
- * Strong position in the electronics market
- * Superior technology back-up.

We've given you 5 strong reasons for taking charge of our MIS activities.

In addition, consider our state-of-the-art environment, and, most important of all, responsibilities which will fully match your technical and management skills.

Your involvement will include directing the activities of programmer analysts at divisional headquarters and at 3 operation centers across the U.S. Your area is part of a national network of RJE computers linked to centralized corporate Burroughs Computer. Duties will also bring frequent interface with corporate MIS management.

Requirements include a degree — MBA preferred — at least 8-10 years of systems programming experience in a large-scale operation including at least 4 years in a managerial capacity.

We'll provide a salary commensurate with education and experience plus excellent benefits. You'll also have the opportunity to continue growing within an organization where the contributions of talented systems professionals are valued. Find out more by sending your resume and salary history to:

CW Box 1563, 797 Washington St., Newton, MA. 02160
An equal opportunity employer, m/f

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support
Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

SENIOR PROGRAMMER ANALYST Colorado

Hewlett-Packard in Loveland, Colorado has an opening for an experienced Senior Programmer Analyst. Specifically, we desire someone to help implement software systems on the H-P 3000 Series computer in a high technologically integrated circuit area. The position will involve both programming and system analysis. Qualifications include COBOL/Data Base knowledge, plus 5 years experience and BS in computer science (or equivalent) and an ability to get the job done.

Hewlett-Packard offers excellent working conditions and fringe benefits, including profit sharing, flexible work hours, etc.

For confidential consideration, please send your resume to: Ms. Kathi Kline, Personnel Department, Hewlett-Packard Company, P.O. Box 301-B, Loveland, Colorado 80537.

We are an equal opportunity employer dedicated to affirmative action.

HEWLETT  PACKARD

COMPUTER SCIENCE PROFESSIONALS

MEET THE CHALLENGE WITH GULF

Build a meaningful career in southwest Houston at Gulf Oil's newest and most advanced computer complex. Gulf Science & Technology, one of the operating companies of Gulf Oil, offers an excellent benefit package and competitive starting salaries for...

APPLICATIONS PROGRAMMERS

These positions offer the qualified data processing professionals challenging work assignments in a state of the art computer complex. These positions also offer outstanding potential for career growth and advancement for the person who is willing to meet the challenge.

Prerequisites include a degree in Computer Science or related field, and 2-5 years experience in commercial applications programming using COBOL in a 370/OS-VS or MVS environment. Good working knowledge of IBM JCL and experience with IMS, TSO, and VSAM a definite advantage.

Salaries will be commensurate with education and experience. Qualified applicants are invited to submit their resumes including salary history to:



Mr. J.P. Haney

GULF SCIENCE & TECHNOLOGY CO.

Drawer I-71
P.O. Box 36506
Houston, TX 77036

An Equal Opportunity Employer M/F



Data Processing Professionals

San Francisco Bay Area

Fireman's Fund, a leader in the Insurance Industry, is seeking talented EDP professionals to join us in our modern Computer Center where the latest state-of-the-art facilities exist (including our advanced three 370/168's MP MVS systems). Openings are available in the following areas:

Systems Programmers

Positions require 3 years' Systems Programming experience, strong ALC skills, and a good understanding of MVS and systems 370 concepts. Experience in MVS internals, SMP, measurement and tuning, dump analysis, design and implementation of system software highly desirable.

Sr. Programmer/Analysts -Advanced Systems

STANDARD DEVELOPMENT - positions require 2-6 years' total EDP experience with meaningful background in two or more of the following:

- (1) Systems development methodology
- (2) Automated documentation operators
- (3) TDDD & IPT's
- (4) Internal consulting (with user & technical personnel)
- (5) Data-base inquiry facilities
- (6) Regression testing methodology
- (7) Software evaluations
- (8) EDP Standards and systems assurance

These positions are in a creative, innovative atmosphere and require the following - excellent communication skills, COBOL (shop language), PL/1, and/or MK-IV, TSO and/or Superwylbur.

Programmer/Analysts -Applications

2-4 years' recent COBOL programming experience required. IBM OS preferred, but not required. Responsibilities include design and programming of various financial and insurance-related systems. Both new programming and enhancements.

If you are interested in pursuing a career in a progressive environment where your talents will be recognized and utilized, please call collect (415) 485-6096 weekdays, 8 AM to 5 PM Pacific Daylight Time, or send your application and salary requirements to Dave Norris, Employment Representative, Dept. CW-1, 1600 Los Gatos Drive, San Rafael, California 94911. We offer excellent benefits and a generous relocation policy.



**FIREMAN'S
FUND**
Insurance Companies

An affirmative action/equal opportunity employer m/f/h.

position announcements

position announcements

position announcements

position announcements

position announcements

DIRECTING THE FUTURE

Miniperipherals Product Planner

A Miniperipheral/Terminal position of Control Data has outstanding career opportunities for experienced product planners in the computer terminals and miniperipherals field. The product planners will use their technical background and familiarity with terminal equipment and miniperipheral equipment to evaluate products and markets and to identify marketing opportunities for the division. Through their recommendations the product planner will have a significant impact on the future products of the division. Prior product planning experience or product management experience in the terminals of miniperipherals field is required. If you are interested in directing our future as well as your own call Tom Peluso (612) 482-4458 or send resume to:

CONTROL DATA CORPORATION
2401 North Fairview Avenue
Roseville, MN 55113



COMPUTER PROFESSIONALS

The Reuben H. Donnelley Corporation, a Dunn and Bradstreet Company, is seeking dynamic leaders for participation in the continued development of a highly mechanized publishing system. This system will be utilized in the marketing, publishing, and distribution of telephone directories within the Illinois/Cincinnati area from the Regional Data Processing facility located in Terre Haute, Indiana. The continued growth and achievement of Data Processing has created three immediate opportunities for experienced individuals. Reuben H. Donnelley offers outstanding opportunities for further professional achievement and personal growth within our entire organization. An excellent fringe benefit program is available including profit participation. Degree desired but not essential. Salary commensurate with experience. Positions available include:

PROJECT MANAGER - Opportunity for the individual with previous managerial and extensive systems analysis experience.

DATA BASE/DATA COMMUNICATIONS MANAGER - Opportunity for individual with practical experience in data base systems design in a communications oriented environment.

ANALYST/PROGRAMMER - Opportunity for the individual with previous systems analysis and programming experience.

For immediate attention, please submit your resume with salary history in confidence to:

R.A. Slover
Area Personnel Manager
**THE REUBEN H. DONNELLEY
CORPORATION**
66 South First St., P.O. Box 720
Terre Haute, Indiana 47808
An Equal Opportunity Employer M/F

TELEPROCESSING SPECIALIST

Nationwide steel distributor has opening for individual with proven track record in teleprocessing. We operate in a DOS/VS 148 environment, running BTAM and CICS.

Require candidates with systems programming and remote 3270 experience, and a thorough understanding of protocols and data network structures.

Successful applicant will have technical, PLUS oral and written communications skills to interface with vendors and contribute toward MIS Department long-range growth goals.

Excellent fringe benefits and salary commensurate with experience. Send resume, including current salary, to:

FOSTER L.B. FOSTER COMPANY

415 Holiday Drive
Pittsburgh, Pa. 15220

We Are An Equal Opportunity Employer M/F

COMPUTER & MANAGEMENT SYSTEMS SPECIALIST

Prominent Washington-based natl. trade assn. seeks leader to conduct member activities in mtg. science and manufacturing control areas. Must be degreed. Min. 5 yrs. computer applications exper.; RPG II exper. helpful. Writing and documentation abilities a must. Should be aware of and able to convey significance of developments in computer field. Exciting work in a growing, enthusiastic environment. Salary upper \$20's. Send resume and salary desired in confidence to: Graphic Communications Computer Assn./PIA, 1730 N. Lynn St., Arlington, VA 22209.

programmer analyst

UNUSUAL OPPORTUNITY

to make important contributions in developing and programming new companywide systems in an expanding EDP department. Will eventually supervise other programmers.

Requires proven experience in complex accounting applications in an ON-LINE COBOL system. Career opening with excellent compensation and employee benefits. Send resume with salary history to Personnel Dept.,

ASSOCIATE METALS & MINERALS CORP.

30 Rockefeller Plaza
New York, N.Y. 10020
An equal opportunity employer

ELECTRIC POWER CONTROL - SOFTWARE ENGINEER

Prominent West Coast utility has a vacancy for an Engineer with a background in power control center software applications. Assembly language and Fortran programming experience for SCADA and AGC is required. Degree in engineering or related field is also required. Desire experience in advanced application programming such as Real Time Power Flow, Unit Commitment and Transaction Evaluation. Send resume and salary requirement to:

Employment Office
**SAN DIEGO GAS &
ELECTRIC CO.**
P.O. Box 1831
San Diego, CA 92112
*An Equal Opportunity/
Affirmative Action Employer*

PROJECT LEADER SYSTEMS PROGRAMMER

Looking for a great career opportunity in sunny Miami, Florida? Southeast Data Processing, Inc., an affiliate of Southeast Banking Corporation is seeking ambitious individuals to grow with an expanding company. If you have experience leading conversion from 2 158 UP's using OS/VS1 to MVS/MP 158's, then our excellent benefits, and career growth opportunities are for you. We would appreciate no agency correspondence. Send your resume and salary requirements to:

Ms. Deborah Kellermann
1001 N.W. 7 St., Miami, FL 33136
Equal Opportunity Employer

SR. DATA BASE ANALYST/PROGRAMMER

Supervise programming of University data base management system. Sr. Analyst experience required. Data base experience desired. Excellent benefits.

Send resume to:
University of San Francisco
Personnel Office
2130 Fulton St.
San Francisco, CA 94117
Affirmative Action EOE

DATA PROCESSING OPPORTUNITIES JEDDAH, SAUDI ARABIA

Whittaker Corporation, a leader in international health care services, has an immediate need for experienced data processing professionals in the following positions:

SENIOR ANALYST SYSTEMS AND PROCEDURES

There are two project team leader positions available:

(1) Material Management Information Systems

Requires a broad background in design and implementation of computer based systems for:

- Supplies catalogues
- Purchasing
- Inventory control and management
- Property control

(2) Finance and Personnel Information Systems

Requires a broad background in design and implementation of computer based systems for:

- Accounts payable
- Budgeting/general ledger
- Cost accounting
- Payroll and personnel

These positions require the ability to interface effectively with the user organizations and to implement the manual systems for data preparation, flow and control.

SYSTEMS ANALYST

There are two positions available

- 2 years experience as systems analyst plus 2 years as a computer programmer is required
- Material or financial systems design experience is desirable

COMPUTER PROGRAMMER

There are two positions available:

- 3 years experience using RPG II in an IBM environment is required

For all the positions listed above:

Experience with a multiple-facility health care systems would be advantageous.

Experience with IBM 370 hardware and software capabilities is required including:

- DOS/VS power
- RPG II

Benefits for these two year contract assignments include a competitive salary, medical and life insurance, exciting travel opportunity as well as furnished living accommodations.

For further information & confidential consideration, please forward your current resume with salary history to:

TEMPLE CANNON, Sr. Recruiter
International Recruiting

Whittaker

LIFE SCIENCE GROUP
10880 Wilshire Blvd., Suite 604
Los Angeles, CA 90024

An Equal Opportunity Employer M/F

DUNHILL EDP talks YOUR LANGUAGE

You are currently needed and wanted for immediate nationwide EDP opportunities

Programmer-CPCS-3890 Mach	\$23K
Software Systems-IBM-MVS	\$25K
Senior Programmer/Analyst-EFTS-COB-ALC	\$20K
Programmer/Analyst-DBMP-DOS/VS-COB	\$20K
IMS Specialists-DB/DC, DICT, TUNE, GEN	\$25K
Senior/Analyst-Oil-Gas-All Types	\$25K
Analyst/Software-ALC, PARS, FINANCIAL	\$18K
Programmer-8080-FORT-ASM-MICRO	\$25K
Prog/Analyst-Heavy Bank, OS/DOS, VS, COB	\$20K
Programmer/Analyst-INTERCOMM/ADABASE	\$21K
Programmer/Analyst-Bank-Loans	\$20K

Rush your resume including salary history to: TED A. LEHR, EDP Specialist-DUNHILL EDP, 22 E. Mitchell Dr., Phoenix, AZ 85012... or call (602) 264-1166... Company inquiries are also invited... 100% EMPLOYER RETAINED... Member of DPMA and ASM.

position announcements

position announcements

position announcements

position announcements

position announcements

DIRECTOR INFORMATION SERVICES

To plan, organize and direct the increasing activities of technical staff of a rapidly-growing, non-profit library services organization.

Activities include:

1) hiring and supervision of staff growing from 4 to 12 in next year; 2) operation of data center serving 180+ institutions; 3) telecommunications support of services received via associated high-speed network of 2100+ terminals; 4) planning, development and implementation of self-operated network, with Atlanta-based data center as hub, as a leading member of an emerging nationwide network.

Qualifications include:

1) 8-10 years of solid data processing experience in medium to large scale computer environment; 2) demonstrated management capability of development of large data base-oriented, online applications system; 3) personal communications ability for frequent interaction with leaders in international library and information services community.

This southeastern membership organization offers competitive salary, comprehensive benefits, relocation assistance, interesting and challenging environment and outstanding living and recreational opportunities.

Send resume with references and salary history by July 5 to: Personnel, Suite 410, 615 Peachtree St. N.E., Atlanta, GA 30308.



the Southeastern
Library Network

An Equal Opportunity Employer

Sargent & Lundy, a prestigious engineering consulting firm founded in 1891 and presently employing 4,000, seeks additions to its EDP staff. You will be part of a first-rate team of data processing professionals, and work in close alliance with other programmers and systems analysts on a project basis.

Programmers

COBOL

To qualify, you should have a sound background in creative programming, testing, debugging and documentation of management information systems. Familiarity with third generation operating systems will enhance your qualifications.

Systems Analysts

COBOL

Seeking experience in computer-oriented systems design, including flow charts, files, data bases, on-line systems design, telecommunication support and file structuring. A college degree with solid systems design experience will qualify you.

Qualified candidates will be offered the opportunity for career growth and advancement within a technically dynamic EDP environment, as well as excellent compensation, benefits, and modern working conditions at our new Chicago Loop offices. For prompt, confidential consideration, submit resume or write letter, outlining your background and salary history, or call (collect):

K. Chadwick (312) 269-3572

SARGENT & LUNDY
ENGINEERS

55 E. Monroe Street
Chicago, Illinois 60603

An Affirmative Action Employer M/F

DTSS Incorporated
requires

TECHNICAL REPRESENTATIVES

We need experienced computer marketing and programming personnel to provide technical support for The Dartmouth Time-Sharing System.

Duties include client visits and sales presentations as well as installation and support for new systems. This is an exciting opportunity to develop a career while living in a rural area. Job includes moderate travel in the US and abroad.

Required qualifications are experience with major computing languages and excellent oral/written communication skills. Familiarity with DTSS is a big plus, as is familiarity with other major computer systems. Bachelor's degree preferred. Salary commensurate with experience.

Send resume to:

Michael R. Vitale, Director of Marketing
DTSS INCORPORATED
P.O. Box 799, Hanover, N.H. 03755

GROW WITH US...

If you are looking for a place to work where each day presents new challenges and there is no limit to your ability to learn and earn, consider American Management Systems.

SYSTEM PROGRAMMERS

We need systems professionals who have experience in using:

- . MVS, MVT, VSI
- . JES2, HASP
- . CICS, IMS, WYLBUR, TSO
- . VM, CMS

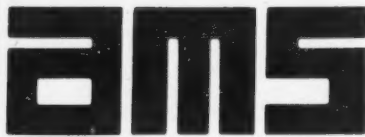
We are especially interested in funding two senior systems programmers: one who can take charge of planning and carrying out a conversion from OS to MVS; and the other who can plan and carry out the installation of IMS DB/DC. These two positions are in the AMS Computer Center in Arlington, Virginia which is in the Washington, D.C. metropolitan area.

SYSTEMS SOFTWARE/ TELECOMMUNICATIONS EXPERTS

To work in the design and development of very large scale systems on IBM computers. Work will include selection of software packages; data base design, development of systems standards; analysis of database security restart/recovery, hardware/software performance, and telecommunication networks. We are especially interested in finding senior data base design experts - some with experience using IMS DB/DC and others with experience using ADABAS and CICS. These positions for senior experienced professionals are available in our Washington, D.C., New York, Chicago and Detroit offices.

American Management Systems is a management consulting, software products and computer services firm founded in 1970. In 1977 our sales were \$21 million, in 1978 we will reach \$30 million. We have sustained this growth by attracting and keeping highly motivated people who are good at what they do and thrive in an atmosphere that rewards a commitment to excellence.

If this sounds like your kind of firm, let us hear from you. We pay top salaries, have a competitive benefits package, and pay your relocation costs. Send resume and salary history to:



American Management Systems

Judith D. Ross
Director, Professional Recruiting

Department A

1515 Wilson Boulevard
Arlington, VA 22209

An Equal Opportunity Employer M/F

Washington • New York • San Francisco • Chicago • Detroit

EDP PROFESSIONALS at ITT Grinnell

Exceptional opportunities to participate in the development of a new corporate data center utilizing an IBM 370/3031 (OS-VS 1)

World leader in sophisticated piping products and systems with current business in excess of \$500 million, ITT Grinnell looks confidently forward to continued business success. To keep pace with the company's demonstrated vitality, we're expanding our EDP systems and facilities. In a climate of positive change and growth, we seek specialists qualified for the following positions.

Systems Programmer

To install and maintain existing applications on a 3031 system and to develop software capabilities for future DP needs. Will establish standards for use of software system and evaluate system efficiency and productivity. Requires minimum 6 years experience including 3 years systems programming in an OS-VS 1 or MVS environment. Should be familiar with communication systems.

Systems Analyst

To analyze information for developing and modifying systems applications. Must be able to work closely with company personnel to gather information, solve problems and define systems objectives. Designs applications and guides their installation. Requires 6 years DP experience including 3 years COBOL/OS programming/analysis experience.

Programmer Analysts

To design and test program logic, code programs and prepare them for computer operation. Assist in establishing file requirements and processing specifications and prepare documentation of completed programs. Opportunity to advance into systems programming. Requires 3 years COBOL programming experience.

Positions based at our Providence, R.I. headquarters. Salaries and benefits excellent. Reply fully stating salary history and indicating position of interest, in confidence to: Sherry Bearse, ITT Grinnell Co., 260 West Exchange Street, Providence, R.I. 02901.

or call collect (401) 831-7000, Ext. 518

ITT Grinnell

Wherever Piping Is Involved

An Equal Opportunity Employer, M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Programmer/Analysts

BAL, COBOL, or PL/1
experience necessary

CHANGE GEARS...

in a relaxed
Rocky Mountain University Community
No Commuting... Informal Atmosphere

SHIFT UP...

to an expanding, respected international service company

IBM 158 AP/3033, OS/MVS/TSO, RAMIS mini-computers, interactive systems, optical scanning, large scale file maintenance. Experience in market research, direct mail, subscription fulfillment, statistical analysis, or name and address processing desirable, but not required.

Starting salary from \$12,000 - \$18,000, depending on qualifications and relevant experience. Relocation expenses paid. For further information, please call:

800-525-2246 (toll free)
between 7am & 6pm (MDT)

NEODATA SERVICES

a division of A.C. Nielsen Company
An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMERS

Transamerica Information Services, a major state of the art data processing organization located in Los Angeles has career opportunities available for highly qualified professionals.

MVS SYSTEM PROGRAMMER

Primary duties will include SCP maintenance, PUT and SU installations, SYSGEN, IBM PSR interface, and problem determination & resolution. Position requires comprehensive system programming & operating experience with large processors, MVS, JES 2, TSO, SMP service aids, debugging & VSAM. Knowledge of 168MP, and of subsystems designs and conventions helpful.

SR. SYSTEMS PROGRAMMER

Senior level Systems Programmer required with CICS or other large teleprocessing monitor experience and a working knowledge of MVS, JES 2 and TSO. Expertise with EP VTAM/NCPnd TCAM helpful. Responsibilities will include debugging and tuning CICS, generating and maintaining JES 2, performing TSO support activities, and conducting associated evaluations and recommendations. Will assume project leadership responsibilities.

We offer outstanding opportunity for professional development, excellent compensation, and rewarding futures. Please forward resume including salary history for confidential consideration.

PERSONNEL B-500
1149 South Broadway
Los Angeles, CA 90015

Transamerica
Information Services

Equal Opportunity Employer

PROGRAMMER/ANALYST

\$25,000

GO WITH THE BEST...
SYSTEMS & COMPUTER TECHNOLOGY
AT THE UNIVERSITY OF ALASKA

We're SCT, a recognized expert in providing EDP systems and computer center management to colleges, universities and local government throughout the USA. Opportunities for career growth and advancement are very strong within the company. Right now an excellent opportunity is available at the University of Alaska Computer Network (UACN) to participate in the development, expansion, and enhancement of a variety of applications systems.

This position requires a degree and 2 years of systems development experience using COBOL. Additional specific experience in the following is desirable: University Systems, Financial Systems, Honeywell (GCOS) and on-line applications.

In addition to an excellent salary in the mid-twenties (including cost-of-living adjustment), we offer a complete benefit package which includes company paid vacation. CALL COLLECT:

Manager Administrative Systems
907/479-7665
Monday-Friday, 12Noon-9pm (CDT)

Or send resume to:

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION

P.O. Box 95101
Fairbanks, Alaska 99701

An Equal Opportunity Employer M/F

Illinois Board of Higher Education Data Base Manager

FUNCTION: The Data Base Manager is responsible for file structures, data dictionary, access controls, performance and maintenance of the Illinois Board of Higher Education data base.

SALARY: Upper Teens to Lower Twenties, depending upon experience and qualifications.

BACKGROUND: Working experience with IMS Data Base Management System required. Programming experience in COBOL is preferred; experiences with OS/JCL and report generators (e.g. EASY-TRIEVE), would be helpful.

AVAILABILITY: This position is available immediately; applications should apply before July 7, 1978 to:

Dr. James J. McGovern
Illinois Board of Higher Education
4 West Old Capitol Sq.
500 Reisch Bldg.
Springfield, IL 62701
(217) 782-2551
An Affirmative Action
Equal Opportunity Employer

DIRECTOR - MIS

Our client is a manufacturing organization in need of director who has worked his way up through programming and analysis and has experience in running computer operations and establishing controls. The successful candidate comes from a high volume OEM type product company. His is a manager first, and bottom line oriented. The position is at corporate in Chicago with a starting salary up to 35K and profit sharing and 10% bonus. Call (305) 358-9280 or send resume to Michael Rottblatt, Ott, Hertner & Assoc., 1401 Bricknell Ave., Suite 603, Miami, FL 33131.

HOUSTON

The fishing is great, the water, skiing is great, etc., but all of that is immaterial. The important thing is that Houston's data processing market is great. This includes programmers, analysts, managers, scientific people, etc. Test the water by calling Jim Fleming COLLECT at (713) 961-3271 or send your resume to:

ROBERT HALF
PERSONNEL AGENCIES, INC.

4801 Woodway,
Suite 231W
Houston, Texas 77056

PROGRAMMER ANALYSTS

Join our centralized MIS function working with advanced hardware & software in our conveniently located central N.J. headquarters. Exp ranges from 2-5+ yrs. COBOL exp on IBM 370, OS/VS 1 & background in financial systems preferred. Degree in computer science or related degree an added plus.

We offer an attractive salary, a comprehensive package of fringe benefits, liberal relocation allowances & most importantly a high visibility position with exceptional opportunity for career advancement. Interviews can be arranged at your convenience. Forward a resume & current earnings to David Alai, Corporate Employment Manager. Agency replies accepted.

FEDDERS
CORPORATION
EDISON, NEW JERSEY 08817 U.S.A.

An Affirmative Action and
Equal Opportunity Employer

Illinois Board of Higher Education Programmer-Analyst (Research Associate)

FUNCTION: Aid in the analysis of data for the Board of Higher Education by writing computer programs to summarize and integrate data files.

SALARY: Mid to Upper Teens, depending upon experience and qualifications.

BACKGROUND: Applicants should have knowledge of OS/JCL and COBOL. Experience with IMS and EASYTRIEVE is helpful.

AVAILABILITY: This position is available immediately; applicants should apply before July 7, 1978.

Dr. James J. McGovern
Illinois Board of Higher Education
4 W. Old Capitol Square
500 Reisch Bldg.
Springfield, IL 62701
(217) 782-2551
An Affirmative Action/
Equal Opportunity Employer

COMPUTER PROFESSIONALS

Computer Management with Sunmark Industries

Sunmark Industries, a subsidiary of Sun Company, Inc., is involved in the marketing of wholesale and retail petroleum and automotive products, in the eastern United States. Presently, our Finance and Systems Department, located in center city Philadelphia, has need of two high level, ambitious computer professionals.

DIRECTOR

Information & Computer Systems

Will be recognized as the primary source of computer expertise and budgetary control. Will be responsible for the overall coordination and consolidation of separate systems and data processing efforts being conducted by Sunmark. The successful applicant will have major impact on the development of short and long range system plans, the maintenance and improvement of existing systems for financial control and decision-making needs.

To qualify, the candidate must have top level experience in managing EDP systems organizations and their key functions, plus a proven distinguished background in administrative and technical supervision. Must be able to deal with top level management. Salary to \$40,000.

MANAGER

Systems Operations

This position will have overall responsibility for the management, control, maintenance and data base administration of Sunmark's hardware, software, vendor contracts, security, training and user consulting. In addition, the position requires establishing system standards and auditing compliance; designing modifications for present systems to improve efficiency and satisfy information needs and conducting supervision of an Analyst Staff and some outside vendors.

Position qualifications will include a proven background in systems management with an emphasis on up-grading systems efficiency and cost savings for employer, the ability to balance and satisfy user needs, integrate systems and set priorities. Salary to low \$30,000.

As a subsidiary of Sun Company, Inc., Sunmark can provide excellent opportunities for career development and professional satisfaction plus excellent corporate benefits. Interested applicants should send their resumes, including salary requirements, in confidence, to: Z-95, P.O. Box 2069, Philadelphia, PA 19103.

SUNMARK INDUSTRIES

A Division of Sun Oil Company of Pennsylvania

An Equal Opportunity Employer, M/F

DIRECTOR OF TECHNICAL SERVICES

Indiana University Purdue University at Indianapolis

The 22,000 student IUPUI campus in Indianapolis, serving both Indiana and Purdue Universities, is looking for a highly qualified data processing manager to assume responsibility for the direction of its Technical Services Department.

Technical Services has full responsibility for all systems software on the three academic mainframes at the Indianapolis Campus: DEC 1090 with 512 K words of memory and 800 MMBytes of disk storage, IBM 370/125, and 360/44. All three systems are used for instructional and research computing, with some administrative applications. The 370/125 is used for operating systems instruction and, as such, runs DOS/VS, OS/VS1, and VM/370. Technical Services includes groups specializing in statistical and mathematical programming, operating systems, telecommunications, consulting, and software systems, with a staff numbering about twenty.

The Indianapolis computers are part of the Indiana University Computing Network and are connected to a 370/158 AP running MVS and a CDC 6600/CYBER 172 multimainframe complex, as well as to a large number of small computers.

The Director of Technical Services plays a vital role in coordinating computing activities throughout the campus and in consulting on computing needs for research projects. To meet the challenge of this position, the Director should have at least six years of experience in increasingly responsible positions, including three years in a supervisory position. He or she should be a strong manager with strong communications skills, and an excellent background in systems programming. This is a high visibility position within the University, and requires heavy interaction with faculty and administrators. Academic experience and an advanced degree are highly desirable.

This position offers considerable challenge and potential for success. Fringe benefits are excellent, including four weeks vacation and eleven paid holidays, with starting salary to \$26,000 for a qualified individual.

Please submit resumes to:

Ms. Phyllis Gootee
Personnel Department
1100 West Michigan Street
Indianapolis, Indiana 46202

DATA PROCESSING

EDP

Professionals Positions S.E. & Nationwide

Supervisor - Systems Programming	\$30,000
Os Systems Programmers	\$23,000
Data General/FORTRAN Analyst	\$24,000
BAL Programmers	\$18,000
COBOL Programmers	\$18,500
D.P. Manager - 370/Retail	\$25,000
D.P. Manager - MRP/MFG	\$24,000
IMS or TOTAL Programmer	\$21,000
DMS2/COBOL/B-6700 Analyst	\$21,000
CICS On Line Analyst	\$23,000

BAI, Limited
229 Peachtree St. NE
Suite 2010 Cain Tower
Atlanta, GA. 30303
(404) 581-0040

(EDP Recruiters - No fee or contract)

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS PROGRAMMER

We are looking for a Systems Programmer to work on a 3031 at KMS FUSION, INC., a company in Ann Arbor, Michigan, doing laser fusion research.

The Computing Department is small and the work will be varied and challenging. You will be responsible for the computer operations, and will also maintain MVS. We are looking for someone with at least 3 to 5 years experience as a Systems Programmer on OS or OS/VS - This is not an entry level position.

Applicant should be familiar with Assembler, FORTRAN, COBOL, OS-JCL, and utilities, and should have performed a SYSGEN. You will also be working with CINCOM's "TOTAL", Speakeasy, TCAM/TSO, and graphics applications.

KMS FUSION offers excellent fringe benefits in a suburban university atmosphere. Starting salary is competitive and based on experience and ability.

Applicant must be a U.S. citizen and be able to obtain a security clearance.

Please send resume and recent salary history to:

KMS fusion, inc.

Director of Personnel

Code - SP

Box 1567

Ann Arbor, MI 48106

We are an Equal Opportunity Employer M/F

PROGRAMMER FLORIDA OPENING

EMR, a manufacturer of high technology electronic equipment has an opening for a Programmer in our Data Processing Department. The successful candidate will have at least 3 years experience in a manufacturing environment with thorough knowledge of COBOL and RPG II on any IBM mainframe. Data based communications experience desirable.

We expect to double our hardware and communications capabilities as well as our programming staff within the next year. Our company offers an excellent compensation and benefit program. If you would like to join our growing team, please submit your resume and salary history to:

SANGAMO WESTON

Schlumberger

EMR TELEMETRY

PO BOX 3041

SARASOTA, FLORIDA 33578

We Are An Equal Opportunity Employer M/F

PROGRAMMERS

Here's your opportunity to participate
In developing a major new Database/
Data communications system
Utilizing the most current techniques

Exciting and challenging career growth potential exists in our rapidly expanding installation. Your professional experience should include a record of accomplishment with increasing levels of responsibility. You should have an IBM 370 background, proficiency in ANS COBOL and strong business applications experience. Knowledge of database/data communications concepts would be a plus.

We offer attractive salaries and a complete benefits package which includes pension plan and tuition reimbursement. These are highly visible positions offering solid advancement.

If you would like to be part of this outstanding team and your background and qualifications are equal to the challenge, we'd like to hear from you.

For immediate consideration, rush your resume including salary history to:

Mr. J. Chiaro

Dell Publishing Co.

Change Bridge Road

Pine Brook, New Jersey 07058

An equal opportunity employer M/F

Dell

Software/Hardware Professionals

Powerful growth prospects... Full-range of NCR mainframes... San Diego living!

Want the stimulation inherent in developing a brand new generation of small to large total computer systems? Want exceptional visibility in one of the biggest, most far-reaching pioneering efforts ever undertaken by a major computer manufacturer? Want southern California living at its best? Join us!

At NCR's award-winning facilities in San Diego you'll have a chance to "do it all". We're developing new systems architecture, and integrating controllers, memories and software for the most powerful family of processors we've ever built. You'll be breaking new ground. You'll have wide open career paths, and all the growing room you'll ever need.

And you'll have the San Diego lifestyle. Seventy miles of beaches from San Clemente to the Mexico border. One of California's most sophisticated cities. Sixty-five golf courses; major colleges and universities; and showcase computer facilities on a 114-acre site north of San Diego in Rancho Bernardo.

It all adds up to powerful reasons why—if you have experience in one or more of the following areas—you should contact us at once.

SOFTWARE PROGRAMMER ANALYSTS

- Distributed Network Architecture, Transaction Processing, Interactive Processing
- Operating Systems and Compiler Development, Data Base
- Firmware, Diagnostic Programming
- Performance Measurement and Analysis

NCR

Complete Computer Systems

An equal opportunity employer

HARDWARE ENGINEERS

- Design Automation, Memory Devices, Logic Design, Test Systems
- Components (Semiconductors), Product (Electro-mechanical)
- I/O Subsystems, Integration, Configuration
- MICR/OCR/OMR Engineering

Send resume and salary history to:
Professional Placement Department,
Engineering and Manufacturing,
NCR Corporation, 16550 W. Bernardo
Drive, San Diego, CA 92127.

Meet our
technical representatives in these
cities. To arrange a
convenient interview in
advance, call George
Rice (collect) at
(714) 485-2153.

Boston	June 18 & 19
San Francisco	June 23 & 24
Chicago	June 23 & 24
Detroit	June 25 & 26
Dallas	July 7 & 8
Houston	July 9 & 10
Milwaukee	July 14 & 15
Minneapolis	July 16 & 17
Philadelphia	July 21 & 22
Washington, DC	July 23 & 24

DATA PROCESSING PROFESSIONAL San Francisco Bay Area

Data processing subsidiary of expanding Bay Area bank located in Walnut Creek (25 miles west of San Francisco) seeks a professional to participate in, lead and support banking application projects. Responsibilities include project management, interfacing with software and hardware packages for general use and user liaison. Should be familiar with IBM hardware, DOS/VS, COBOL and BAL. Banking application experience preferred.

Benefit package includes company paid profit sharing, life and disability insurance programs. Comprehensive medical/dental insurance available at nominal cost. Please send resume including salary history to:

Karen L. Dixon
Vice President/Personnel Mgr.

SECURITY NATIONAL BANK

1500 Newell Ave.
Walnut Creek, Ca. 94596
(415) 944-6104
EOE

WANTED: NATIONWIDE REPUTABLE EDP RECRUITMENT PEOPLE

The Computer Talent Source is an EDP recruitment and placement network comprised of several established firms who share a belief in high ethics and morals as well as effective service to the EDP industry.

We are now inviting others who share our beliefs, and enjoy ethical reputations in their market areas, to consider the substantial benefits of an association with us.

**the
Computer
Talent
Source**

THE DPCenter
4615 Southwest Freeway, Houston TX 77027
713-960-9102

XAVIER ASSOCIATES
850 Rear Providence Hwy, Dedham, MA 02026
617-329-6280

McCORMICK & ASSOCIATES
386 N. York Rd., Elmhurst, IL 60126
312-530-1200

position announcements

position announcements

position announcements

position announcements

position announcements

PROJECT MANAGER DATA COMMUNICATION ST. LOUIS LOCATION

Key new position created as part of major new data processing initiatives required to support corporate development and expansion programs. Excellent opportunity for leadership role in network communications design as part of the creation of distributed processing for a national chain of unique new consumer financial service centers.

We are looking for a self-directed individual with a minimum of 3 years' network design experience involving knowledge of data collection techniques and transmission methods. We are offering the excitement, challenge and reward of bold new data processing activities along with the solid backing of Citicorp and its resources.

We are tremendously excited about our data processing plan and think you will be too! For consideration, send resume or letter in confidence to: Mr. Paul Hatz, P.O. Box 21538, St. Louis, Missouri 63162

CITICORP NATIONWIDE
FINANCIAL
SERVICES CORPORATION
A Subsidiary of Citicorp
An Equal Opportunity
Employer M/F

Programmers Programmer/Analysts Systems Analysts

Tired of routine type work? Looking for a challenging position including light travel, paid overtime and an exciting technical environment? If so DASD is for you. We are a national consulting firm with openings in all of our Eastern Region Branches.

We offer an attractive benefit package along with an exciting career opportunity. If you feel you qualify in any of the following areas

COBOL
DBOMP
BASIC
RPG
IMS

ASSEMBLER
FORTRAN
TOTAL/E1
PL/1
CICS

OR

MINI-COMPUTERS
Please Send Your
Confidential Resume To:

DASD
PLYMOUTH PLAZA SUITE 205
580 WEST GERMANTOWN PIKE
PLYMOUTH MEETING,
PENNSYLVANIA 19462
215 - 828 - 7050

DASD
CORPORATION

An Equal Opportunity Employer, M/F

Data Base Analyst

My client, a prominent Mid Atlantic \$400 million division of a billion dollar corporation, has one of the most advanced Data Base programs in the country.

They seek a college graduate, 0-2 years experience (computer science and/or MBA a plus) with good analytical and verbal skills plus some knowledge of data base design.

Salary to \$18,000, EXCELLENT promotional opportunity within near future and above average benefit package. Call or send resume IMMEDIATELY.



FORTUNE
MANAGEMENT ASSOCIATES
SYSTEMS DIVISION

1528 Walnut St., Phila., Pa. 19102 (215) 546-9490

Programmer/Analyst

Data Processing

An immediate opening exists for a Programmer/Analyst in a progressive System/3 - Model 15D installation. Applicant must have a minimum of 2 years RPGII programming experience on the SYS/3. Manufacturing experience is desired. MRP, IPICS experience a plus. Excellent salary and fringe benefits. Send resume in confidence to:

J.R. Jones
Div. Mgr. Employee Relations
Boise Cascade Corp.
P.O. Box 514
Berryville, VA 22611
Equal Opportunity Employer

SOFTWARE SPECIALIST II

Boise State University is seeking a Senior System Programmer to provide technical support for its DOS/VS, POWER/VS, DL/I, CICS, RJE installation. The successful applicant will not only provide reliable operating system, but will help set the future direction of the entire center. Five years DP experience required, including three as System Programmer. Applicable education may be substituted. Good benefits. Send resume and 3 references by July 17, 1978, to: Barry E. Boydston, Ctr. for Data Processing, Boise State University, 1910 University Dr., Boise, ID 83725

Boise State University is an EEO employer/educator.

ST. LOUIS

DIRECTOR - SOFTWARE PRODUCT PLANNING Our exclusive client serving the thrift industry seeks an aggressive, creative **proven manager** to direct its product/service planning function. At least 5 years EDP management experience, 3 in the thrift or banking industry required. **REAL** opportunity for "self-starter"! Degree required. **To \$35K**

SALES REPS - Mini Computers; EDP Services.

Top Hardware mfg., and national service bureau seeks experienced sales reps who desire to earn \$25 to \$45K! Manager potential. Degree, business experience required.

PROGRAMMERS To \$25K
Rapidly expanding high technology division of **LARGE** co. seeks assembly language programmers with at least 2 years exp. to develop software for its new product line. PDP, RSX-11 exp. a plus. **UNLIMITED GROWTH!**

SYSTEMS PROGRAMMERS To \$30K
All levels, 1 or more years exp. IBM 370, PDP, CDC, GRAPHICS. Midwest, Southwest, West locations. Are you ready for the **BIG MOVE?**

ASSEMBLY LANGUAGE PROGRAMMERS - 1 or more years experience. SUPER OPPORTUNITIES! To 24K.

(All fees paid by client companies.)

ROBERT HALF PERSONNEL AGENCIES
7733 Forsyth - Suite 360
St. Louis, MO 63105
(314) 727-1535

COLLEGE GRAD JAPANESE SPEAKING Marketing Trainees

My client, an International Fortune 500 Business Machine/Mini-computer Sales Co. seeks 4 Bi-Lingual Japanese-English speaking recent Business/Computer Science graduates to enter a special, accelerated Marketing/Sales Management Training Program with eventual placement in the Japanese Sales Subsidiary of the Corp. Please send 2 copies of your resume to the:

International
Marketing Recruiter
PO Box 685
FDR Station, NY 10022
Equal Opportunity Employer M/F

Instructor: Customer Service Division

Year around climate, low cost of living, no state or city taxes

Plus A Career Opportunity With An Industry Leader

Datapoint Corporation, one of the fastest growing companies in the computer and data processing field, has an excellent opportunity at its headquarters in San Antonio, Texas. San Antonio, with its outstanding year around climate, excellent schools, hospitals, cultural activities, and appealing residential areas, is an ideal place to live. Here, Datapoint, the leader in dispersed data processing, has an immediate opportunity for the individual with at least 2 years of technical school or equivalent and a minimum of 1 year full-time teaching experience on digital computer systems. Completion of a military or company-based instructor training program and experience in software are highly desirable.

Your responsibilities will include curriculum development and instruction on micro processor, disc-based systems. You will be structuring a training course with emphasis on system trouble-shooting and repair techniques. This position offers a very competitive income, a generous benefits program, and a challenging work environment providing both personal and professional growth.

FOR IMMEDIATE ATTENTION, PLEASE SEND YOUR RESUME IN COMPLETE CONFIDENCE TO:



Mr. Dan Haynes
Datapoint Corporation
9725 Datapoint Drive
Mail Station M-83
San Antonio, Texas
78284

DATAPOINT CORPORATION

The leader in dispersed data processing™

We Are An Equal Opportunity Employer M/F

MAJOR EXPANSION COMPUTER SPECIALISTS

Outstanding career opportunities in Albany, N.Y. are now open with our client, a Fortune 300 consumer products company with corporate headquarters in Upstate, NY. Upstate, NY offers a Suburban/Rural environment with excellent recreational facilities as well as many cultural activities. It is situated in the foothills of the Adirondack Mountains, just minutes from Lake George and Saratoga Springs, NY.

DATA BASE ADMINISTRATOR

Your six to ten years in EDP should have given you a thorough knowledge of DL-1 Data Base Systems. Responsibilities include setting strategy and policy for the entire corporation. Salary to \$30,000.

SR. FINANCIAL/ANALYST

Two to five years manufacturing or business environment experience is required for this corporate staff position. You should have a B.S. M.B.A. is desirable and an in-depth knowledge of designing financial systems. Salary to \$25,000.

EDP AUDITOR

One to three years in performing audits of small to large complex computer systems. Conducting audits of computer operations including the examination and approval of controls within the environment. This position answers to the Manager of Internal Audit and Control. B.S. degree required. Salary to \$25,000.

CAREER ADVISORS

125 Wolf Road-Albany, N.Y. 12203

(518) 458-1810

Our client assumes all interviewing expenses, relocation expenses and fees.

position announcements

position announcements

position announcements

position announcements

position announcements

Our computers help make the perfect fit

JOB SEEKERS

JOB OPENINGS

CYBERSEARCH® is the computerized technical/professional employment service for recruiters and job seekers. Here's why it works much better than conventional matching of jobs with applicants.

Faster. Our computers can make a local or nationwide search for applicants in minutes.

More accurate. Better matching eliminates wasted interviews.

More complete. Information readily available from the data bank. Can't be misfiled or out-of-files.

Confidential. Individual and company names are coded.

EMPLOYERS, call nearest Cybersearch office for immediate service.

Ask for the Data Processing Department.

JOB SEEKERS, please send resumes.

CYBERSEARCH

The COMPUTERIZED Employment Service

CHICAGO, IL 214 North Michigan 60601 312-454-8490	IRVINE, CA 17744 Sky Park Boulevard 92714 714-754-7701	PHILADELPHIA, PA Two Balacony Plaza 19004 215-687-2400
DALLAS, TX 8545 Stemmons Freeway 75247 214-688-5810	LOS ANGELES, CA 8816 La Tijera Boulevard 90045 213-642-2462	SAN JOSE, CA 2025 Gateway Place 95110 408-866-3186
HOUSTON, TX 2000 West Loop South 77027 713-965-5666	MINNEAPOLIS, MN 6800 France Ave. South 55435 612-830-6650	

CONTROL DATA CYBERSEARCH INC.

CONTROL DATA CORPORATION

Data Processing

Senior Systems Analyst

FISCHER & PORTER has an immediate need for a Senior Systems Analyst to work on an on-line, data base, State-Of-The-Art, system. Duties include the planning, coordination, development and documentation of new and revised systems. Emphasis will be placed on on-line order entry and marketing systems.

This position entails extensive user contact, involving conceptualization of systems from business problems.

You should have 5 years of experience in these areas, Plus a Degree in Business Administration or the equivalent.

In considering FISCHER & PORTER, remember:

- We have a history of steady growth.
- We are an established company with more than 40 years of technical excellence.
- All of our U.S. based Administrative, Technical and Production facilities are in the Delaware Valley.
- We are a leader in a very stable industry: Process Control.
- Our product line is State-Of-The-Art.
- We offer excellent salaries, benefits, growth potential, and a convenient suburban Phila. location.

To apply, please submit your resume, with salary history, to Mr. T.J. Haines, FISCHER & PORTER CO., E. County Line Road, Warminster, PA 18974. An equal opportunity employer, M/F.

FISCHER & PORTER
GROWTH WITH A PURPOSE
through worldwide excellence
in instrumentation

WE NEED DMS-1100 SPECIALISTS!

Sperry Univac's Technical Services Division provides solid and responsive support to computer systems users. Systems design, applications and systems software analysis, programming; Technical Services does it all — backed by Sperry Univac, a world leader in the design, manufacture and application of computer systems.

We are forming a group of DMS-1100 Specialists who will be responsible for providing customers with advanced data base technology. Projects will involve design and development of major data base systems using DMS-1100, OLP and TIP.

Requirements exist for DMS-1100 Internal Systems Specialists and DMS-1100 Applications Analysts. As a member of our division, you will have every opportunity to put your experience and ability to maximum use. We are recruiting for opportunities in the following locations:

- Washington, D.C.
- Albuquerque, New Mexico
- Research Triangle Park, North Carolina

If you are a DMS-1100 Specialist, contact us immediately and find out what Technical Services has to offer you.

CALL JOHN DePRIMA COLLECT AT:
(703) 558-4486

Or Rush Resume To:

1901 N. Moore St., 11th Floor
Arlington, Virginia 22209
Attn: J. DePrima

SPERRY UNIVAC

TECHNICAL SERVICES DIVISION

An Equal Opportunity Employer M/F/H



EDP AUDITOR

Prominent Boston financial services org. seeks sharp EDP Auditor for internal staff. Requirements include lge. COBOL business systems exp. & excellent customer interface skills. No travel. Excellent oppty. with an unlimited career path. Salary to \$25,000. Contact Gerry Battista (Fee Paid)

ROBERT HALF PERSONNEL AGENCIES

140 Federal St.
Boston, Mass. 02110
(617) 423-6440

SYSTEMS

OPPORTUNITIES

Growth of Dixico Incorporated, a Dallas based, diversified, international manufacturing company, enjoying a 30% growth rate, is resulting in major expansion of its management systems group.

Excellent growth opportunities, utilizing distributed data processing, are available in Dallas, Los Angeles and Connecticut in design development and administration of multiple, geographically dispersed computer-based systems.

You must have experience in design and project management related to manufacturing, financial and general business systems with data communications, and interactive processing in a distributed environment.

Explore this opportunity by sending your resume, including accomplishments and salary history to

Dick Atkins
DIXICO Inc.
P.O. Box 225116
Dallas, Texas 75265
Equal Opportunity Employer

WHAT IS YOUR TRUE WORTH?

It's a seller's market for EDP professionals... you are the seller. Because of this you should take a "hard look" at what your present position offers you... salary, advancement, etc.

We offer assistance in evaluating your present position. Just send us your resume, or a note outlining your experience, no obligation to you... we will call you to discuss your objectives with you.

Sr. Anal/Proj Mgrs	\$24-30	Sys Prog/Tech Mgrs	\$24-32
Sys Analysts	\$20-27	Mini/Scl. Progs	\$18-24
Prog/Analysts	\$18-24	EDP Auditors	\$20-25
Programmers	\$15-23	Mgrs Sys/3 RPG-11	\$19-26

NATIONWIDE -- FEE PAID -- CONFIDENTIAL

For more information, contact or send resume to:



Mark Fuller
CADILLAC ASSOCIATES, INC.

32 W. Randolph St., Chicago, IL 60601 312/346-9400

Energy Management Systems Programmer Operator

Challenging new position open in sunny Albuquerque to project manage a dual EMS Computer System to be operational in 1979. Responsibilities include approval of manufacturer developed software and hardware documents consistent with contractual guidelines and project objectives.

Upon completion of system acceptance testing and field integration, the Programmer will develop new power applications programs and other programming techniques, while being responsible for on-going software maintenance.

Applicant should possess a background in, or knowledge of, Electric Utility Power Operation and be experienced in Assembly, Fortran and other computer languages.

If interested, please send resume, salary history and reference to: Plains Electric Generation and Transmission Cooperative, Inc. 2401 Aztec Rd., NE, Albuquerque, NM 87107.

**Plains Electric
Generation & Transmission
Cooperative, Inc.**

an equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

JOIN THE LEADER IN COMPUTER LANGUAGE DEVELOPMENT

Intermetrics Inc. is a rapidly growing high technology firm actively engaged in design and development of sophisticated compilers, high-order languages, data bases, avionics and navigation systems. A couple of our recent outstanding accomplishments include being selected as one of two companies in the world to design the Iron Man language and developing the HAL compiler for the space shuttle. Key growing areas of business are in public service, space exploration projects and commercial applications. We are seeking qualified personnel in the following areas:

COMPILERS WRITERS with 2-7 years experience writing compilers and knowledge of high-order languages such as Fortran, Pascal Simula and PL-1.

SENIOR LANGUAGE DEVELOPERS with 3-15 years experience designing and developing high-order languages, data bases, and/or software tools.

PROJECT MANAGERS with at least 5 years experience writing compilers; good communication, leadership and interpersonal skills.

We have openings in Cambridge, MA, Washington, D.C., Houston, Texas and Long Beach, CA. We offer outstanding salaries and benefits including group insurance, 3 weeks paid vacation and profit sharing.

If interested, and qualified, please write or call collect MIKE ADAMS, PERSONNEL MANAGER.

INTERMETRICS, INC.

701 Concord Ave.
Cambridge, MA 02138
(617) 661-1840

An Equal Opportunity Employer M/F/H
U.S. Citizenship Required

INTERMETRICS

TECHNICAL SUPPORT CONSULTANT UNIVAC 1100

UNIVAC SA/Project Manager or Senior Systems Programmer with UNIVAC 1100 experience required for challenging position as technical consultant to Computer Operations and Support group in a new UNIVAC account. Looking for someone with 10-12 years experience and/or appropriate education who has detailed working knowledge of the application and internals of EXEC 8, CMS, TIP, DMS 1100, SIP, etc. in an on-line environment. Installed equipment includes an 1100/40 3x2, 24 U36, 5 U30, 54 8433, 2 CSP with a 200+ CRT Terminal network going to 2,000+ within three years. Plans include replacement of the 1100/40 with two 1100/80 systems within 12-15 months.

This position has been established to advise the Director of Computer Operations and Support on the installation and operation of the UNIVAC 1100 and the support of more than 500 data processing professionals developing welfare management and medical systems in New York State. The individual selected will have served as project leader in a large UNIVAC 1100 site or in a comparable position with a UNIVAC customer for a minimum of two years and will be totally competent with UNIVAC hardware and software as well as with the COBOL and Assembler languages, including TIP/DMS. Starting salary range is from \$25K to \$27.5K plus extensive fringe benefits.

We also have a number of openings for junior systems programmers with UNIVAC experience in the \$14-16K range.

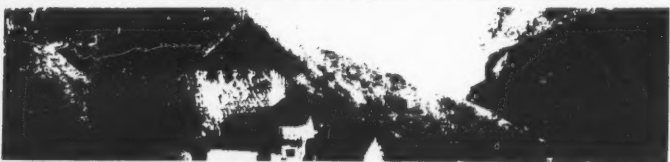
For immediate and confidential consideration, please send resume to:

J.M. Murray - director
MIS Operations

NYS Department of Social Services- 10B

40 North Pearl Street
Albany, NY 12243

Affirmative Action, Equal Opportunity Employer



PROGRAMMERS EUROPEAN ASSIGNMENT

Our client company has immediate needs for 6-12 Systems Programmers for permanent (1-3 years) assignment in Frankfurt, Germany. Real Time Mini-computer experience (1-5 years) at the assembler level is required. This will entail task development and implementation, systems testing, and software installation. All expenses (relocation, Major Medical) are paid in full. Monies are paid in Deutsch marks at U.S.A. rates (\$16-27K) depending on experience. Knowledge of German language a plus.

Call us for immediate referral.



digital arts group

Engineering & Software Personnel Consultants
Nine Bedford Street, Burlington, MA 01803

(617) 273-2780

MANAGER ON-LINE SYSTEMS

N.E. multidivision corporation expanding on-line distributive processing network. Exp. manager with large IBM systems background qualifies for senior level management responsibilities. Starting salary to mid 30's. Contact Stan Durbas. (Fee Paid)

ROBERT HALF PERSONNEL AGENCIES

111 Pearl St.
Hartford, Conn. 0603
(203) 278-7170

COMPUTER SCIENCE:

Two positions in an Applied Computer Science Program. Openings beginning September 1978. Position one is a permanent position at the Instructor, Assistant Professor or Associate Professor rank. Salary Range: \$13,371-\$18,784. Master's degree in Computer Science or related field plus 10 hours of graduate credit for the Assistant Professor rank, or Ph.D. in Computer Science or related field for Associate Professor rank. Teaching duties include undergraduate course as well as advanced courses in Computer Science. Other duties include advising students and participating in departmental committees and activities. Professional experience with computer applications or systems desired. Position two is a temporary position at the Instructor or Assistant Professor rank. Salary Range: \$12,742-\$16,246. Bachelor's degree in Computer Science or related field plus 15 hours of graduate credit for the Instructor rank, or Master's degree in Computer Science or related field plus 10 hours of graduate credit for the Assistant Professor rank. Business experience in COBOL Programming, work with files, and data bases required. Teaching duties include teaching undergraduate applied Computer Science courses in an expanding program. Other teaching duties would include beginning courses as well as courses in the data processing branch. Other duties include advising students and participating in departmental committees and activities. Send application to Gary Butterbaugh, Chairperson, Search Committee, Computer Science Department, Indiana University of Pennsylvania, Indiana, Pa. 15705, by July 14, 1978. An Affirmative Action/Equal Opportunity Employer.

PROJECT LEADERS

SOUTH

Accomplished prog/analyst ready to move into project management, strong background in IBM including IMS CICS, Assembler a plus, 16 to 20K. Send resume in confidence to:

SEARCH E.D.P., INC.
P.O. Box 8032
Cin., OH 45208

COMPUTER SCIENCE FACULTY

The Computer Science Department at North Adams State College is seeking a full-time person to teach COBOL, FORTRAN, Data Processing and Systems Analysis courses beginning in the fall semester 1978. Candidates should hold a Ph.D. degree and preferably have some industrial experience in a business data processing environment. Applications and resumes must be submitted by July 7, 1978 to Dr. Leonard Adelson, Chairperson, Computer Science Department, North Adams State College, North Adams, MA. 01247 An Equal Opportunity/Affirmative Action Employer.

PROGRAMMER/ ANALYST

We seek individual experienced in COBOL, FORTRAN, and IBM JCL in IBM 360/370 OS environment. Minimum 3 years experience in analysis and programming of large application systems. Ability to write and maintain documentation as well as assisting in evaluation and development of new systems is essential. Familiarity with Equipment Management Information Systems is necessary. Individual will be required to travel 25% to 35% of the time, working with system transfer jurisdictions. Salary 25K based on qualifications. Send resume to Rusty Tambascio, Public Technology, Inc., 1140 Connecticut Ave., N.W., Washington, D.C. 20036, EOE.

MARICOPA COMMUNITY COLLEGES

Due to expansion in both educational and management computer systems, the District seeks qualified professionals for the following openings:

COMPUTER CENTER MANAGER

Responsible for computer operations, input production control, applications systems and programming. BA/BS degree. Five to eight years management experience.

EDUCATIONAL COMPUTER SERVICES MANAGER

Responsible for planning, implementing and administering educational computer systems and services. Works with instructors and administrators to develop educational programs. BA/BS degree. Five to eight years successful related experience.

SENIOR SYSTEMS PROGRAMMER

Responsible for analyzing, generating and modifying IBM 370 operating systems. Required experience of five to seven years in OS/VS1, DOS/VS, 370/VM and standard compilers. MUSIC time-share preferred. Communicate well with instructors and administrators.

SYSTEMS PROGRAMMER

Responsible for analyzing, generating and modifying IBM 370 operating systems. Experience of three to five years in OS/VS1, DOS/VS, 370/VM and standard compilers. MUSIC time-share preferred.

EDUCATIONAL COMPUTER SPECIALIST

Responsible for analyzing and implementing assigned educational computer systems and projects. BA/BS degree. Three to five years experience in educational computer systems field. Communicate well with instructors and administrators.

MANAGEMENT SYSTEMS ANALYST

Responsible for analysis, design and implementation of administrative systems. BA/BS degree preferred. Four to six years experience in large business or educational systems, on-line applications, good knowledge of data base systems. Communicate well with administrators.

The Administrative area provides you with UNIVAC 1100/11 and the educational area provides you with the dual processor with Comten communications, H-P 2000, Five Remote Minicomputers.

We provide you with a good salary and an excellent fringe benefits package.

Please send your resume and salary requirements to:

Personnel Office

**Maricopa
Community
Colleges**

P.O. Box 13349
Phoenix, AZ 85002

an equal opportunity employer
action/title IX/handicapped/employer

SYSTEMS PROGRAMMERS

Transamerica Information Services, a major state of the art data processing organization located in Los Angeles has career opportunities available for highly qualified professionals.

MVS SYSTEM PROGRAMMER

Primary duties will include SCP maintenance, PUT and SU installations, SYSGEN, IBM P5R interface, and problem determination & resolution. Position requires comprehensive system programming & operating experience with large processors, MVS, JES 2, TSO, SMP service aids, debugging & VSAM. Knowledge of 168MP, and of subsystems designs and conventions helpful.

SR. SYSTEMS PROGRAMMER

Senior level Systems Programmer required with CICS or other large teleprocessing monitor experience and a working knowledge of MVS, JES 2 and TSO. Expertise with EP VTAM/NCpd TCAM helpful. Responsibilities will include debugging and tuning CICS, generating and maintaining JES 2, performing TSO support activities, and conducting associated evaluations and recommendations. Will assume project leadership responsibilities.

We offer outstanding opportunity for professional development, excellent compensation, and rewarding futures. Please forward resume including salary history for confidential consideration.

PERSONNEL B-500
1149 South Broadway
Los Angeles, CA 90015

Transamerica
Information Services

Equal Opportunity Employer

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

**USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR:**

☐ ☐ ☐ ☐

a new subscription

new address

new title

new industry

Order form is attached through binding. Be sure to include current label or label information when making a change.

first class
permit no 40760
newton ma

BUSINESS REPLY MAIL no postage stamp necessary if mailed in the United States

postage will be paid by



COMPUTERWORLD

**797 Washington Street
Newton MA 02160**

CIRCULATION DEPARTMENT

position announcements

position announcements

position announcements

position announcements

position announcements

others talk about it — we've got it

MINI-COMPUTER FIELD POSITIONS

With the V-77 series, Sperry Univac continues its dynamic growth in the mini-computer world! Become a part of that growth.

SALES ENGINEERS

Weigh these advantages:

- The best commission plan in the industry.
- Competitive products to sell.
- A highly respected, worldwide customer engineering support organization.
- Challenge and real growth opportunities.

Requirements:

- Minimum 2 years mini-computer sales experience in the Data Base, Data Communications and/or Distributed processing marketplace.
- Record as a closer.
- Technical Competence in hardware and software.
- Record of maintaining account relationships.
- Ability to obtain new and repeat business.

FIELD SYSTEMS ANALYSTS

Key responsibilities in:

- Marketing headquarters interface.
- Sales/proposal preparation.
- Defining and solving customer requirements.

Requirements:

- Technical degree desirable.
- Creative problem solver.
- Minimum 2 years pre and/or post sales support.
- Real-time commercial (Data Base, Data Communications, Distributed Processing) and/or real-time scientific applications.

If you're a leading performer with your current company, don't pass up this opportunity to make a smart move.

You will find:

- Professionally challenging environment.
- Room for advancement.
- Achievements recognized.

For openings in: Atlanta • Birmingham, Alabama • Boston
Cleveland • Hartford, Conn. • Englewood Cliffs, N.J. • Long Island
Orlando, Florida • Rochester, N.Y. • Washington, D.C.
call Dave Volz (collect) at (215) 542-2798,
or send your resume to P.O. Box 500, B-301M,
Blue Bell, Pennsylvania 19424.

For openings in Chicago • Denver • Detroit • Houston
New Orleans • St. Louis • Seattle
call Al Sack (collect) at (714) 833-2400, Ext. 336,
or send your resume to G-5, 2722 Michelson Drive,
Irvine, California 92713.

SPERRY UNIVAC

MINI-COMPUTER OPERATIONS
An Equal Opportunity Employer M/F

MOVE SOUTH

We can help you. In addition to our own clients, over 100 associate personnel consulting firms refer openings to us. Our membership in the National Association of Personnel Consultants and the Georgia Chamber of Commerce assures you of a professional, ethical, confidential search. Our fees are all paid by the hiring company. Current openings in the sun belt include:

CICS P/A	to \$22,000
Banking P/A	to \$22,000
Sys. Mgr/Sr. SA	to \$25,000
Banking SA	to \$22,000
COBOL or RPG Prog	to \$18,000
IMS positions	to \$22,000
EDP Audit	to \$28,000
MRP SA	to \$24,000
Manufacturing Sys. Mgr	to \$30,000

Also continuing requirements for minicomputer experience, systems programmers, scientific systems. Many additional positions nationwide.

Call Now (404) 262-2566 or write:

Jim Staal, Manager Information Systems Division



Whitten & Associates
3390 Peachtree Road, N.E. - Suite 236
Atlanta, Georgia 30326

COMPUTER SCIENCE FACULTY POSITION

Fall 1978. Applicant should have at least a Master's in Computer Science or related area (or equivalent professional computer experience), knowledge of two high-level languages, plus some special area of competence (such as computer business applications, databases, hardware, etc.). Emphasis is on teaching undergraduates at a four-year college of the State University of New York located in the beautiful Genesee Valley region of Western New York. Deadline extended to July 15, 1978. Resume to: Ms. Stacey Edgar, Search Committee/Computer Science, State University College, Genesee, NY 14454. An Equal Opportunity/Affirmative Action Employer.

Data Processing Opportunities SAUDI ARABIA

SYSOREX INTERNATIONAL, INC., rapidly growing systems management company innovating multitechnology systems for organizations & companies worldwide, seeks experienced Data Processing Professionals for the following positions:

OPERATIONS MANAGER

You will be involved in the operation of large-scale IBM teleprocessing system, multi-shift data conversion efforts, & micrographics production. Position requires min. 6 years solid Data Processing background and at least 2 years in significant management systems.

PROGRAMMER/ANALYSTS

You will be involved in applications design and programming in a TP environment on IBM/370 OS systems. Positions require min. 5 years experience, along with fluency in 80 COBOL and Assembler languages and knowledge of IBM's CICS and 3270 terminals.

USER INSTRUCTOR

You will train operations personnel in the various uses of ongoing applications systems. Complete knowledge of systems operations coupled with instructor's skills essential; BA/Computer Science a plus. You may be required to travel extensively throughout the Middle East and must speak Arabic fluently.

DATA PREPARATION SECTION LEADER

You will be responsible for all data preparation activities including document processing, classification, and coding. Must have supervisory ability with min. 2 years administrative experience. Must also speak and have an excellent command of written Arabic.

SYSOREX offers salaries commensurate with experience & a comprehensive benefits program which includes 30-day annual vacations with paid round-trip transportation for employees & family to place of residence, 15 paid Holidays, free furnished family housing & free education to children.

Please send resume, including salary history, to John J. Hagan, Director of Personnel & Administration, SYSOREX INTERNATIONAL INC., 10590 N. Tantau Avenue, Cupertino, CA 95014.

SYSOREX

Sysorex International Inc.

SR. PROGRAMMER/ ANALYST

San Francisco Peninsula

Program your future
with VERSATEC

Consider this newly created position in VERSATEC's Systems Development Group. We are looking for an experienced Professional, to assume project responsibility for evaluation design and implementation of microprocessor-based remote graphic systems. BS/EE or CS required.

This position requires significant design experience in one or more of the following areas:

- Remote communications
- Interfacing peripherals to microprocessors
- Operating systems development of I/O drivers for devices such as floppy disks, magnetic tape, printer/plotter or CRT terminals.

We'd like to tell you more about VERSATEC — our excellent compensation and benefits package which includes Dental and Retirement Plans, as well as our forecast for continued dynamic success.

Please send your resume with salary requirements, in confidence, to Dean Hammer, Employment Manager.

VERSATEC
A XEROX COMPANY

2805 Bowers Avenue
Santa Clara, CA 95051
(408) 988-2800

An equal opportunity employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER ANALYST SENIOR PROGRAMMER

Major S.E. Corporation headquartered in Atlanta has immediate openings for EDP professionals in IBM 370 installation. Individuals should have a minimum of two years programming experience on IBM equipment using COBOL. Accounting background desirable.

We offer a career opportunity with a progressive company, excellent benefits, competitive salary and Atlanta location. Please send resume and salary history in confidence to:

Personnel Department
Southern Company
Services, Inc.
P.O. Box 720071
Atlanta, GA 30346

An Equal Opportunity Employer M/F

Southern Company Services

MANAGER

Minicomputer
Systems/Operations

Responsibilities include coordination and administration of academic interactive computing facility. Duties include assisting faculty and students, training and supervising student operations, and managing system resources.

An advanced degree and professional work experience in an academic computing environment is preferred. Knowledge of FORTRAN and BASIC is essential. Some statistical background is desirable.

Salary competitive. Submit complete applications including resume and references to Miami University, 22 Hughes Lab Oxford, Ohio, 45056. Deadline July 14, 1978.

MEDICAL INFORMATION SYSTEMS ANALYST

Positions available for M.I.S. Analysts in the following Areas: Medical Research; Discharge Information; Nursing; Admitting; Laboratory.

Degree in Computer Sciences, Engineering or Business. 3 years experience in Systems Analysis required. Statistical Analysis Programming and previous hospital experience preferred. Responsibilities include implementing and developing new medical systems and maintain integrity of present systems.

Other M.I.S. positions available in Medical Ancillaries.

Excellent career opportunity. Please send resume including education, experience and salary requirements to: Dale Harper, Personnel Services, Methodist Hospital, 1604 N. Capitol Ave., Indianapolis, Ind. 46202. An Equal Opportunity Employer.

DATA BASE CONSULTANT- INFORMATION SCIENCES

Heavy exp in either RAMIS, NOMAD, MARK IV IDS or TOTAL. Good communication skills. Sales and Systems support with this sophisticated 370 shop. Position in Metro NYC. \$26,000 FEE PAID

ROBERT HALF PERSONNEL AGENCIES, INC.

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

SYSTEMS PROFESSIONALS

NATIONWIDE SERVICE

Dir MIS, Dn Hq To 40K

Systems Dev Mgmt, Consumer Goods, New England

Sr. Sys Plnrr To \$28K

New England, Mfg Exp Multi Plant, Degree

Sys Consult. To \$30K

Strong O/S Systems, NYC

O-R-T-U-N-E DATA

LIVE ORLEANS PERSONNEL AGENCY

505 5th Av. NYC 10017

(212) 682-8600

Company Inquiries Invited

DP MANAGER

Position reports directly to Controller of med. size div. of major Central NYS mfr. Resp. will include project mgmt from inception to implementation. Sophisticated Sys. 3 disk equipt. Oppty. for diversification into mfg. & financial mgmt. PICS & MRP sys. a plus. \$22,000. Contact P Siegal. (Fee Paid)

ROBERT HALF PERSONNEL AGENCIES

1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202
(716) 842-0801

Match Your Growth Rate To Ours!

PROGRAMMER ANALYSTS

Come grow with On-Line Systems, Inc., where our growth is your opportunity.

In just 10 short years we've grown from a small timesharing company with one Pittsburgh office to a major Computer Services Company with offices in 18 U.S. cities and abroad.

Right now we're looking for Programmer/Analysts with 2 to 5 years of Fortran and/or other programming language experience, plus the desire to respond personally and professionally to our customers needs. (DBMS, IBM 360/370, or DEC experience desirable). Positions currently exist in several major cities such as: Philadelphia, Pittsburgh, Dallas, Washington, D.C. and Cleveland.

If you are an innovative enthusiastic professional who wants to work where your ideas are valued, we urge you to talk to us.

Please send your resume, including location preference and salary history, in confidence to: Wallace A. Conway, Jr., National Recruitment Manager.

Dept. P.A.

On-Line Systems Inc.

115 Evergreen Heights Drive, Dept C
Pittsburgh, PA 15229

Equal Opportunity Employer

Our Growth . . . Your Opportunity

OVERSEAS

Programmers

To \$55,000

Free

Our client is looking for Sr. Programming Consultants who have consulted with hq., government officials to plan developing nations use of computers. Experience in drawing up budgets and migration plans is desirable.

Positions exist for Sr. Level LANDSAT Data Reduction experts with experience in Geology, Hydrology, Photographic Interpretation, and Geographic Data Bases.

Other 18 month contracts exist for IMS Programmers; DBA's; EDP Management Specialists; Systems Analysts Regional Planners.

For immediate and confidential consideration mail resume with salary history to:

Long Management Consultants Agency L M C

SYLVIA B. LONG
(213) 990-1875

15910 Ventura Boulevard • Regency Suite 800 • Encino, California 91436

EDP ANALYST

FEEL DEAD ENDED IN YOUR CAREER? Now is the time to take action and make a change. Move into a challenging, creative position with the foremost publishers of Data Processing and Data Communications reference materials . . . AUERBACH PUBLISHERS INC.

If you're presently working as a Product Analyst . . . Systems Support Specialist . . . Competitive Analyst . . . or Information Science Specialists, and have organizational, analytical, written and oral communication skills — we have several key managerial positions in our Editorial Department that are right for you.

You'll receive excellent salary and benefits, and will work in a highly professional atmosphere with opportunities for advancement. For prompt consideration send your resume and salary history in confidence to Kathleen Murphy.

AUERBACH PUBLISHERS INC.

6560 North Park Drive

Pennsauken, N.J. 08109

Equal Opportunity Employer, M/F

AUERBACH

AUERBACH Publishers Inc. is the foremost authoritative source of computer, data processing, data communications and management reference materials in the world

DATA PROCESSING OPPORTUNITIES

Cutler-Williams Inc., one of the nation's leading data processing service companies, has immediate openings in Dallas, Houston, Chicago, Minneapolis, San Francisco, St. Louis, Detroit, Miami, Atlanta, Philadelphia, and Los Angeles for computer professionals. Cutler-Williams provides service for commercial and government clientele throughout the U.S. and has enjoyed increased sales and profitability throughout the last decade.

Some of our requirements include:

- COBOL, ALC, PL/1, Fortran Applications Programmers and Programmer/Analysts.
- Data Base and Teleprocessing expertise specifically in IMS, DB/DC, CICS, (Macro and Command Level), DMSII, IDS and DL/I.
- Systems Consultants and Senior Analysts

Cutler-Williams is dedicated to keeping current with the state-of-the-art, is exclusively in the Data Processing servicing business and provides the opportunity to work with clients in all types of industries. Our employee benefits include life, health and accident, long-term disability and dental insurance. Our superior salaries, corporate education and efforts to provide you with job satisfaction are the best in the industry. Please send resume to:

CUTLER-WILLIAMS INC.

2655 Villa Creek Dr. #205, Dallas, TX 75234

or call collect:

Atlanta	Pat Blake
(404) 321-1743	
Chicago	Rich Brzozy
(800) 323-5010	
or (312) 296-8155	
inside Chicago	
Dallas	Barbara Reed
or Kris Vollmer	
(800) 527-4907	
or (214) 243-3421	
inside Texas	
Detroit	Pat Cobb
(313) 336-8900	
Los Angeles	Mike Kassel
(213) 822-0888	
San Francisco	Maureen DelSole
(415) 392-1400	

an equal opportunity employer M/F



position announcements

position announcements

position announcements

position announcements

position announcements

Are you good enough at what you do to teach it?



"What - me teach? Forget it! That's what I thought when I was a co-op instructor here. I left Data General to look for the real world. I came back. Because the real world is right here. And there's no more exciting place to be than right up front with all the new product developments. That's right - TEACH! You can too, if you're good enough!

Ken Rodrigues
Supervisor,
Software Education



"Never a dull moment! You have to know your subject cold to teach it, when you're dealing with adults who have to know. I've always liked explaining things. As a Data General instructor I never have to worry about motivating the class. They're here because they're already motivated."

Maureen Hamilton
Sr. Educational
Specialist

Software Instructors

With 2 or more years' real time systems or applications programming experience (assembler and higher level languages) on mini-to-medium computers, you're on your way. Knowledge of operating systems and communications, previous teaching experience desirable. You will develop and conduct programming/software courses for customers. And there is the opportunity to keep your hand in applications programming.

Systems Training Specialists

You need 5 or more years' in systems or applications programming in a real time disc operating system environment. Minicomputer experience is desirable. Teaching or presentation experience a plus. You will develop and conduct systems courses for our sales and applications personnel and work with customers on advanced systems/application programs.

You don't have to be an instructor to qualify. But you do have to be good at what you do.

Send us your resume, with this ad to Jon Zion at Data General Corporation, Route 9, Mail Stop 6-1, Southboro, MA 01772. Or call him collect at (617) 485-9174. Data General is an equal opportunity employer, M/F.

Openings exist at our headquarters in Westboro, as well as Boston, Chicago and Los Angeles.

I'm good enough to teach what I know. Here's my resume.

Signature _____

Data General

DATA PROCESSING PROFESSIONALS

SENIOR SYSTEMS ANALYST SENIOR PROGRAMMER

Fox Industries, a growth-oriented Company, has excellent immediate opportunities at its Belle Vernon, PA computer facility for ambitious individuals seeking career development in a data base/data communication environment using 370/145, DOS/VS & CICS, and DL/I software. We offer competitive salaries commensurate with your experience in addition to generous company-paid benefits, and growth potential. The following positions are available.

Senior Systems Analyst

This position requires an individual with good analytical skills and possessing at least 1 to 4 years' experience in data base design, communications design, and scanning. A college degree is preferred. Previous exposure to a retail environment would be helpful.

Senior Programmer

This position requires an individual with at least 1 to 4 years' COBOL programming experience, including data base programming. You must have previous analytical experience.

For immediate attention, please send your resume stating salary history and background to: Manager, Employment.

FOX INDUSTRIES, INC.
400 Penn Center Blvd.
Pittsburgh, Pennsylvania 15235
An Equal Opportunity Employer, M/F

FLORIDA MANUF/PROS

Large, modern, technically sophisticated Division of Fortune 500 manufacturer located in the Sunshine State has requirements for Systems Analysts (no programming involved) in the areas of Manufacturing Systems and Financial Systems related to manufacturing. Experience in these areas of Three or more Years is Required and a College Degree is desirable. Salary expectations in the Mid Twentys. Please submit resume including Salary History or Call

**FRANK LEONARD
PERSONNEL**
1211 N. Westshore Blvd.
Suite 100
Tamp: Florida 33607
(813) 872-1853

PROGRAMMER

Every wonder why **ROCKY** was filmed in PHILADELPHIA?

Success stories are made here.

Perceptive ANS COBOL programmer w/ON-LINE exp will join prominent PHILA area firm. Sound MFG apps bkgd from lge ac. ie IBM environ essential. Sophisticated communication capable of assuming ANALYST role nec.

Please call for immed intv. appt or forward resume to

**ROBERT HALF
PERSONNEL AGENCIES**

2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

WRITE YOUR OWN TICKET



As a result of urgent projects requiring immediate staffing, we are able to offer unparalleled opportunities to qualified programmers and analysts in these areas:

- * PARS/ACP
- * PL/I
- * IMS

This special offer will be withdrawn after these positions are filled.

Toll Free

800/543-7583

In Ohio Collect:

513/890-1200

or Send Resume to:

2472 West National Rd
Cincinnati, Ohio 45247

Equal Opportunity Employer M/F

**ALLEN
SERVICES
CORP.**

Offices: Atlanta/Chicago/Dallas/Denver/Detroit/Naples/Tulsa

BUY SELL SWAP

IBM 360 MEMORY FOR SALE

360/30 Core: All sizes to 192K
360/40 Core: All sizes to 448K
360/50 Core: All sizes to 1 Megabyte
360/65MP Core: IBM 2365-13's Two Available

CALL DICK BAKER (305) 561-5207

**dataware
incorporated**

Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207

**MEMBER
CDA**

DEC HARDWARE PDP 11 PDP 8

Processors Peripherals Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

FOR SALE

370/155-J S/N #010206 with features #1433, 7855, 3215-1 and DAT, 2 Megabytes Cambridge Memory.

Available Now

**EVERGREEN COMPUTER
& FINANCIAL, INC.**

One Appletree Square, Suite 251
Bloomington, MN 55420
Phone: (612) 854-2000

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557.

029-059-129

Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. Contact ACS for proposal.

ACS
7126 Mullins
Houston TX 77081
(713) 566-2122
TWX 910-881-1526
EQUIPMENT CORP.

FOR SALE

BURROUGHS-B7II

- High Speed Processor
- 32 KBm Core Memory
- 9.2MB Dual Disk Drive
- Console w/Pin Feed
- 160LPM Printer
- 20 Spare Disk Paks
- Disk Storage Cabinet
- Burroughs Maintenance

Contact: R.E. Simmonds
P.O. Box 108
Huntington, In. 46750
(219) 356-5200

FOR SALE

IBM 360/30F, 64K, 2MIC;
1051/1052; 3237/4760
6960/7520; 4456/4463
4468/5856/4427

CHAMPION SERVICE CORPORATION

19001 Villaview Drive
Cleveland, Ohio 44119
(216) 692-3660
Mr. Hall

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																						
<p>FOR SALE BY OWNER</p> <p>DEC PDP 11/34 RSTS-6B & 6C (Datasytem D533A-AA)</p> <ul style="list-style-type: none"> • 11/34A with 128 KW core • 2 RP06, 176 MB ea. • 1 TJE16 Tape System 800/1600 • 1 DZ11E 16 line MUX • 1 LA36 Decwriter II • 9 VT52 CRT • 1 LP11-WA Line Printer 240/LPM Upper/Lower Case • Expansion Cabinet; LP Interface; Tapes & Disks • Fully DEC maintained • Can be seen in operation • Available immediately • Price: \$125,000 <p>OMAHA STEAKS INTERNATIONAL 4400 S. 96th St. Omaha, Nebraska 68127 PHONE TOLL FREE Alan Simon, 800-228-9521</p>	<p>UPGRADING?</p> <p>Sell us your 3420 Tapes and 3330/40 Disks- all models</p> <ul style="list-style-type: none"> ■ Whether you own or rent equipment, we can save you budget dollars ■ Let us show you how to translate current equipment into savings <p>"Our leasing concepts are sensitive to your needs"</p> <p>COMPUTER CAPITAL CORPORATION</p> <p>1351 WASHINGTON BLVD. STAMFORD CT. 06902 203-357-9663</p>	<p>FOR SALE/LEASE/TELEX</p> <p>8 - 6420-7 Tape Drives 1 - 6803 Control August Delivery</p> <p>AMERICAN COMPUTER & FINANCIAL CORP. 17 East Orange St. Chagrin Falls, OH 44022 (216) 247-3232</p>	<p>FOR SALE SEVERAL NCR 101 Computer Systems Also For Sale</p> <p>657 Disk Drives 646 Train Printer</p> <p>Write or Call: Gary E. Zywotko (612) 884-0758</p> <p>COMPUTER CONNECTION CORP 8120 Penn Ave. S. MPLS, MN 55431</p>	<p>CENTRON Computer Corporation The THINKing person's alternative...</p> <p>BUY • SELL • LEASE</p> <p>IBM Computer Equipment 360/370/30XX and Peripherals</p> <p>Call us for current availability and pricing 612/884-3366</p> <p>8120 Penn Avenue South • Minneapolis, Minnesota 55431</p>																						
<p>FOR SALE</p> <p>IBM 360/40 128K AMS Memory 32k for 360/30 Marshall M2900 Dual Density Disk Drives Marshall M2800 Disk Control Unit</p> <p>Contact: Mike Firtik (312) 898-1234 ext. 329</p> <p>Comprehensive Accounting Corp. 2111 Comprehensive Drive Aurora, IL 60507</p>	<p>BURROUGHS L & B80 Users</p> <p>Now Available: System Language 3 (SL3) Assembler for L-8000, L-9000 • B80 with Cassette or Disk I/O.</p> <p>Contact: Computer Software Co. P.O. Box 19534 Raleigh, N.C. 27609 (919) 828-2009</p>	<p>IBM SYSTEM 3/10</p> <p>(2) 5445 Disk Drives, 40MB (1) 5203 Printer, 200 LPM, 132 Char (1) 5424 Card Reader/Punch 200/100 (1) 5410 CPU 16K (1) 5496 Data Recorder All under IBM maintenance 90 Day Delivery</p> <p>Contact: Ed Martin 305-667-0472</p>	<p>FOR SALE</p> <p>IMMEDIATELY AVAILABLE</p> <p>3-Model 702A Honeywell Keytapes 7 Track 800 BPI Tape Expanded Keyboard & Memory Serial #'s - OAD00984, OAD00804, OAD60925</p> <p>AVAILABLE AUGUST</p> <p>1-Model 702A Honeywell Keytape 7 Track 800 BPI Tape with paper tape spooler attached Serial # - AD00595 1-IBM 026 Keypunch Serial # - 32669</p>	<p>BEST OFFER!!!</p> <p>Call: Hugh Smallwood Phone: 800-638-4780</p>																						
<p>FOR SALE PDP 11/40</p> <p>Including: 192KB, 2 RK05 disk drives, 1 LP11VA line printer and RK05 packs. System Availability: 90 days or less.</p> <p>Contact: Paul Malmø (503) 686-8030</p>	<p>AVAILABLE FOR SALE OR LEASE</p> <table border="1"> <thead> <tr> <th>QTY.</th> <th>EQUIPMENT</th> <th>AVAILABLE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2501 B1 or B2</td> <td>Now</td> </tr> <tr> <td>2</td> <td>3333-11 w/8150</td> <td>July 1</td> </tr> <tr> <td>2</td> <td>3330-11</td> <td>July 1</td> </tr> <tr> <td>2</td> <td>3271-2 w/3250</td> <td>July 15</td> </tr> </tbody> </table> <p>WANT TO BUY</p> <table border="1"> <tbody> <tr> <td>3420</td> <td>Tape Drives</td> </tr> <tr> <td>3803</td> <td>Tape Control</td> </tr> <tr> <td>ITEL 3277-2</td> <td>Display Stations</td> </tr> <tr> <td>7330-1</td> <td>Disk Drives (ISS 3330-1 type)</td> </tr> </tbody> </table> <p>CALL OR WRITE:</p> <p>NF Computer Sales & Leasing Corp. 1211 W. 22nd Street Oak Brook, IL 60521 (312) 920-8181 Member Computer Dealers Association</p>	QTY.	EQUIPMENT	AVAILABLE	1	2501 B1 or B2	Now	2	3333-11 w/8150	July 1	2	3330-11	July 1	2	3271-2 w/3250	July 15	3420	Tape Drives	3803	Tape Control	ITEL 3277-2	Display Stations	7330-1	Disk Drives (ISS 3330-1 type)	<p>COMPUTER TIME AVAILABLE</p> <p>360/30-370/158</p> <p>shared or stand alone time</p> <p>Boston, Ma. Area</p> <p>(617) 762-1399 x 295 Mr. Ware</p>	<p>Want to buy HP 3000 Series I or II</p> <p>Minimum Configuration:</p> <ul style="list-style-type: none"> - 128 Kb Memory - 50 Mb Disk - 800 or 1600 Mag Tape - Console and asynchronous terminal controller <p>Terminals, printer desirable but not necessary. Must be eligible for HP maintenance. Cash or terms. Contact Ms. Olson at (301) 340-6777.</p>
QTY.	EQUIPMENT	AVAILABLE																								
1	2501 B1 or B2	Now																								
2	3333-11 w/8150	July 1																								
2	3330-11	July 1																								
2	3271-2 w/3250	July 15																								
3420	Tape Drives																									
3803	Tape Control																									
ITEL 3277-2	Display Stations																									
7330-1	Disk Drives (ISS 3330-1 type)																									
<p>Data General For Sale</p> <p>840 System</p> <p>Immediate Availability</p> <ul style="list-style-type: none"> - 131KB Core; - Expansion Chassis; - 3 Cabinets; - 2 - 800 bpi 75 ips D.G. 6021/6023 Tapes; - 3 - 4057A 25MB Century Disks; - 8 Line MUX; - Teletype; - 4 - DG 6012 Terminals - 1 - Odec #3424 Printer <p>This system is in daily use and can be seen running.</p> <p>Call: Frederick L. Gaulkner, Sr. (312) 263-4222</p> <p>Graphic Arts Data Service 200 West Monroe Chicago, Illinois 60606</p>	<p>370/138 - w/4655, 8075 September 3344-B2F Disk Drives - July 1st. 3340-A2 & 3340-B2 Disks - July 3420-5 (S.D) July & Sept. 1st. 3803-1 Control Unit - Sept. 1st. 3203-4 Printer (1200 lpm) August 1403-N1 Printer - August 2821-2 Control Unit - August 3277-2 Display Station 4630 & 4633 August 3272-2 Control Unit (w/3250) August 1419 MICR - August 1412 MICR - off line - August</p> <p>Sale/Lease</p> <p>Contact: Bernie Gest 215-635-1700</p> <p>Computer Marketing Inc. 7704 Seminole Ave. Melrose Park, Pa. 19126</p> <p>Member Computer Dealers Assoc.</p>	<p>WE SELL For Immediate Delivery</p> <p>TEXAS INST. 745-765</p> <p>DECWRITER II</p> <p>TELETYPE 43</p> <p>DATA RENTALS/SALES</p> <p>Calif. 213/559-3822 Toll Free 800/421-4505</p>	<p>WE BUY</p> <p>129's with RENTAL PURCHASE OPTION</p> <p>Calif. 213/559-3822 Toll Free 800/421-4505</p>																							
<p>MODEMS</p> <p>Factory Serviced and Tested</p> <p>RIXON DS-9600's 3600, 4800, 7200, or 9600 BPS COMMAND DATA, INC. 165 W. Valley Ave. Birmingham, AL 35209</p> <p>(205) 942-3156</p>	<p>FOR SUBLEASE</p> <p>370/168-U36 with 2860-3, 2870-1, (2) 2880-2. Will lease for 1-4 years guaranteed delivery and installation by October 1, 1978.</p> <p>Contact:</p> <p>Mr. Frederick D. Lehmann Martin Marietta Data Systems P.O. Box 5837, MP-263 Orlando, FL 32855 (305) 855-1050, Ext. 7410</p>	<p>dearborn giveth:</p> <p>3420-6 dual density available immediately 2040-HG 384K all IBM available immediately 7330-1 ITEL 3330-1 w/control unit available June 15, 1978 3830-2 w/two channel switch available June 21, 1978</p> <p>dearborn taketh:</p> <p>2025-ED 48K with ICA any availability</p> <p>Call Tom Millunchick (312) 827-9200</p> <p>dearborn dealer - IBM computers systems software leasing computer company</p> <p>1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200 toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788</p>																								

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

**FOR SALE
OR LEASE**

Type	Quan.	Avail.
3333/11	1	8/1/78
3330/11	2	8/1/78
3420-3 Dual	4	8/1/78
3803-1 Dual	1	8/1/78
3277-2 4630	3	11/1/78
3272-2 3250's	1	11/1/78
3286-2	3	11/1/78

Computer Resources, Inc.
511 Phoenix St.
P.O. Box 527
South Haven, MI
(616) 637-8425

**BROKER
IN
DEC COMPUTER
SYSTEMS AND
COMPONENTS**

C.D. SMITH
730 N. Post Oak Road
#301
Houston, Texas 77024
(713) 686-9405

**ISAM
ACCOUNTS****Receivable Package**

Wanted in Dibal for a PDP
11/34 digital system. Please
contact Ms. Joanne Quinn at
(617) 935-5860 between
9:00 a.m. and 2:00 p.m.

Why Comdisco is First in the Second Market:

145/148
Machines
available
Sale or
Lease

158
U34 NOW
Sale or
Lease
ISC
w/Madrids

168
17 month
lease
Oct. 1,
1978 avail.
U35-Madrids

3033
U04
Oct. ship
17 month
lease

3420
Tape drives
Most models
Sale, Lease,
Trade

3350
A2, A2F
B2, B2F
30 day
delivery
Sale Lease

3340
B2's NOW
Sale
or Lease

3031
3032
3033
Operating
Leases
For 1978
Machines

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107



New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

**FOR SUBLEASE
370/158 MODEL U-36
FOR 26 MONTHS**

WITH
FEATURES: 1433, 1434, 1435, 2150,
4650, 7840, 7905
Z08611 POWER ISOLATION

AVAILABLE: JULY/AUGUST, 1978

CONTACT: W. L. WINK

**MCDONNELL DOUGLAS
AUTOMATION COMPANY**

P.O. BOX 516
DEPT. K063
ST. LOUIS, MISSOURI 63166
(314) 232-4508


MCAUTO

Offices in principal cities from coast to coast.
A Division of MCDONNELL DOUGLAS

FOR SALE/LEASE**DEC LSI 11[®]
PDP 11V03 SYSTEMS**

LA 36 DECwriters
LA 180 * VT 52

In Stock For
IMMEDIATE DELIVERY

 **UNITRONIX CORP.**
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725-2560

3033

(11/78, 2/79 Lease Only)



**BARRETT
CAPITAL
& LEASING
CORPORATION**

14 Redwood Rd.
White Plains, N.Y. 10605
(914) 761-0070

3333-11
3330-11
3340 A2

Available

- CSA is the principal
- Short Term Leases Available
- Delivery & Installation
Guaranteed Under Secured
Documentation
- Configured To Your Needs
- Add or delete features as
required
- Available immediately

Call Marv Berger at
800-225-2036

370/138
Model J, S/N 20021
Features
3274-4640-4655
4722-8075

370/135
Model H, S/N 61154
Features
4640-4655-4670
4672-6981-7855
7861-7862

We want to buy for delivery within 90 days

3211/3811 (2) 3505/B2, 8103
2321/2 3525/P3, 1421, 8399
3803/1 Dual Density 3540/1
3420/3 Dual Density (4)

CSA

Computer Systems of America Inc.
141 Milk Street,
Boston, Ma. 02109
(617) 482-4671

CSA is a private lessor and lease under-
writer with a portfolio of \$300-million-
plus of computers under lease to the
world's leading corporations.

370/158 with AP FOR SALE OR LEASE

- 3158-3, A33
- Total of 4 Meg
- AP Installed
- 5 Channels
- November Availability

make Offer To:
Tom Robbins
Computer Properties, Inc.
Box 35048
Minneapolis, MN 55435
(612) 831-6088

**FOR LEASE**

1 IBM 3350-A2
3 IBM 3350-B2's

October Availability

Contact:

John Hebert

(312) 541-0100

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	\$ 200	\$20/Mo	059	\$1400	\$50/Mo	129	\$3400	\$110/Mo
026	\$ 800	\$30/Mo	082	\$ 800	\$30/Mo	514	\$ 800	\$ 45/Mo
029	\$1800	\$55/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 55/Mo
046	\$ 900	\$40/Mo	084	\$2500	\$90/Mo	526	\$1200	\$ 50/Mo
047	\$1400	\$60/Mo	085	\$1200	\$60/Mo	548	\$1500	\$ 60/Mo
056	\$ 200	\$15/Mo	088	\$2500	\$150/Mo	557	\$2900	\$100/Mo

Sale: 360/20 system: \$9500. WANTED TO BUY: 3741 - \$3800
3742 - \$5200
029 - and -129.

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap																		
FOR LEASE 370/158-2 megabytes system with/ISC 370/168-4 megabytes system with/ISC Contact T.J. McArdle TIGER COMPUTER 415 Madison Avenue N.Y.C., NY (212) 532-1500	<div style="text-align: center;"> <h1>CMI BUY LINES</h1> </div>			360 30/40/50/65 Best of Values 3270 CRT's Printers/Controllers 1130 Jim Carleton System/3 Model 15 Jerry Roberts 3742 3741 5496 Patti Lamia 360/20 085-083-029-059-026-129 Marie Bednarz																		
BUY-SELL TRADE For Computer Call Action Write <div style="text-align: center;"> <h2>CAC</h2> </div> P.O. Box 80572 Atlanta, Ga. 30366 404/458-4425	3031 Delivery 6/79 3032 Delivery 3/79 3033 Delivery 11/79 370/165 370/168 168 Available June '78 (2) Available July '78 370/158 Ron Baker 370/155 (1) Available Now! 370 148/145/138/135 (4) Available now to June 370/115/125 Call for Details	BUY-SELL-LEASE-TRADE Call (313) 362-1000 <table border="1"> <tr> <td>3420</td> <td>3803</td> <td>1403</td> <td>2821</td> </tr> <tr> <td>3333</td> <td>3830</td> <td>2501</td> <td>1442</td> </tr> <tr> <td>3330</td> <td>3340</td> <td>1443</td> <td></td> </tr> </table> Darryl Hastings Joe Romeo BUY OF THE WEEK <table border="1"> <tr> <td> 3031 - 3032 - 3033 New Operating Lease Plans Available For Call for Details </td> <td> 370/135 - H Serial #61290 IFA, ICA, 1 Channel Available Now </td> </tr> <tr> <td> 3742 Available 30 Days System 32-B-33, 16K 9.1 Megabytes 155 LPM Needed Now Immediate Availability Call Patti Lamia </td> <td> 370/145 - H2 3215-01, 3047-01 Needed Now </td> </tr> <tr> <td> 360/20 All Models Immediate Delivery Purchase or Lease </td> <td> 370/155 - J DAT-3 Channels 1 Meg IBM 3215 Console Available Now </td> </tr> </table> Call (313) 362-1000		3420	3803	1403	2821	3333	3830	2501	1442	3330	3340	1443		3031 - 3032 - 3033 New Operating Lease Plans Available For Call for Details	370/135 - H Serial #61290 IFA, ICA, 1 Channel Available Now	3742 Available 30 Days System 32-B-33, 16K 9.1 Megabytes 155 LPM Needed Now Immediate Availability Call Patti Lamia	370/145 - H2 3215-01, 3047-01 Needed Now	360/20 All Models Immediate Delivery Purchase or Lease	370/155 - J DAT-3 Channels 1 Meg IBM 3215 Console Available Now	360 30/40/50/65 Best of Values 3270 CRT's Printers/Controllers 1130 Jim Carleton System/3 Model 15 Jerry Roberts 3742 3741 5496 Patti Lamia 360/20 085-083-029-059-026-129 Marie Bednarz
3420	3803	1403	2821																			
3333	3830	2501	1442																			
3330	3340	1443																				
3031 - 3032 - 3033 New Operating Lease Plans Available For Call for Details	370/135 - H Serial #61290 IFA, ICA, 1 Channel Available Now																					
3742 Available 30 Days System 32-B-33, 16K 9.1 Megabytes 155 LPM Needed Now Immediate Availability Call Patti Lamia	370/145 - H2 3215-01, 3047-01 Needed Now																					
360/20 All Models Immediate Delivery Purchase or Lease	370/155 - J DAT-3 Channels 1 Meg IBM 3215 Console Available Now																					
FOR SALE OR LEASE Burroughs B-4700 System 8 I/O Channel 150K CPU, Card Reader, Card Punch, Line Printer, 4 Tape Cluster. 80 million characters of head per track disk. Contact: B. Hogan Dresser Industries, Inc., 1505 Elm St Dallas, Texas 75201 (214) 745-8809	<div style="text-align: center;">  CMI CORPORATION <i>The IBM Specialists</i> Top of Troy, West Big Beaver and I75, Troy, MI 48084 (313) 362-1000 </div>																					
BUY • SELL TELETYPE MODELS 43 • 33 • 32 NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd Plainville, N.Y. 11803 (516) 293-0444	IN CANADA CALL: <table border="0"> <tr> <td>Don DuPuis Windsor, Ont (519) 258-8910</td> <td>Ron Ridding Toronto, Ont (416) 683-3704</td> <td>Jacques Dagenais Montreal, Que (514) 374-5920</td> </tr> </table>				Don DuPuis Windsor, Ont (519) 258-8910	Ron Ridding Toronto, Ont (416) 683-3704	Jacques Dagenais Montreal, Que (514) 374-5920															
Don DuPuis Windsor, Ont (519) 258-8910	Ron Ridding Toronto, Ont (416) 683-3704	Jacques Dagenais Montreal, Que (514) 374-5920																				
WILL SACRIFICE MOSLER DOUBLE DOOR TAPE SAFE VAULT-4 hour, 76" H x 55" W x 34-1/2" D. COMPU-TEMP AIR CONDITIONER for Computer Room, 10 Ton COMPUTER ROOM FLOORING IBM TYPE 557 Interpreter; 029 and 026 Printing Key Punches; 082 Card Sorter and 519 Document Originating Machine XEROX Model 2400 w/continuous Forms Printer with Sorter IBM Tab Card Cabinets and Magnetic Tape Storage Racks BURST-ER AND DELEVER. Will accept best offer for immediate sale Call Toll Free 1-800-543-0320 asking for Mr. James at Century Enterprises Inc.	<div style="text-align: center;">  <h2>Know us by our mark</h2> </div> CDA, Computer Dealers Association, is an international nonprofit trade association dedicated to promoting the advantages of used computers. For a membership roster and copy of our code of ethics, write to: Mr. Marvin Lurie, Executive Director, Computer Dealers Association, 6650 Northwest Highway, Chicago, Illinois 60631 (312) 763-7350.	MSI — We have a large selection of Azur, MSI and Norand equipment for sale. Low prices, immediate delivery. — Lease plans and third party depot service also available on electronic data entry equipment. — We buy used Norand, Telxon, MSI and Azur equipment. New England Data Corp. 10 Kearney Rd. Needham, Mass. (617) 449-2430	3420-5 Tape drives Immediately available SALE OR LEASE Call Bob Bardagy COMDISCO (312) 698-3000 or your nearest COMDISCO office.																			
135 H FOR SALE OR LEASE • S/N 61514 • IFA, ICA, IPA • August 15 Availability • 24K Control Storage • 256 K IBM Call FORSYTHE McARTHUR (312) 943-3770 Forsythe McArthur Associates, Inc. 919 North Michigan Ave. Chicago, IL 60611	ATTN: BURROUGHS USERS FOR SALE 90 KB B2700-3500 Core \$14,000 B 9243 1100 LM Printer 5,000 B 3353 Multiline Cntrl. 5,000 B 2700 Aux. Cabinet 5,000 All equip. currently under maintenance and guaranteed for maintenance by Burroughs. Write or Call: COMPUTER MARKETING CORPORATION 5651 N. 7th St. Phoenix, Ariz. 85014 (602) 264-5151		AVAILABLE THROUGHOUT 1978 SYSTEM/34s - 5110s IBM/GSD LEASING SPECIALISTS DATELEASE CORPORATION 283 Greenwich Ave. Greenwich, Ct. 06830 (203) 869-1152																			
Dealer & Lessor in IBM Computers Member Computer Dealers Assoc.	For Sale DATAPOINT 2200 Disk System Call Milo Schield 612: 374-9354		BUYING N.C.R. 270-299-399-775 31, 32, 41, ETC. BURROUGHS "L" SERIES, B700, B1700 I.B.M. 129-029-Systems 32/34 SELLING 129's-029's-059's immediate delivery Also: 026-056-082-083-084 085-088-402-403-407-514 519-548-552-557 Eligible For IBM M/A WILLIAM MARION COMPANY, INC. P.O. BOX 309/HACKENSACK, N.J. 07602 FOR MORE INFORMATION CALL (201) 343-4554																			

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115

370/125



ECONOCOM
1255 LYNNFIELD ROAD
P.O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

BUYING, SELLING, LEASING
OR TRADING IBM EQUIPMENT?
THEN CALL US FIRST...

CSI COMPUTER SALES INTERNATIONAL, INC.

901 Office Park Plaza Oklahoma City, Ok 73105 405-840-1911

Houston, Tex. 713-444-0246 St. Louis, Mo. 314-727-7010



IPS
201-947-4200

WANTED TO BUY

168, 158, 148, & 138's. 165,
155, 145, & 135's. 360/65's.
All 370 peripherals; 3277's -
any keyboard; 3272's - w/ or
w/o 3250.

FOR SALE OR LEASE

4MB 168 MEMORY 135 MEMORY

Available 7/15/78.

165K-II

4 MB w/ DAT & chnls.

158-U34

Will configure to spec. avail.
8/15. 158 ISC avail. 7/30

155J-II

Up to 2 MB w/ DAT

145-H2

4660 + 3/4 MB Intel. Avail-
able 8/30/78.

MADRID'S

145/148 - 2152, 6111. Avail-
able immediately.

138-J

Avail. 8/1. Sale or lease.

IBM H-I; FE-GD; GD-GF. Sale
or lease, avail. 7/1.

125-H

Available 8/1. Sale or lease.

65-I, IH or J

Up to 2MB &/or 6 chnls.

3420's

Some avail. w/controllers.

3350's

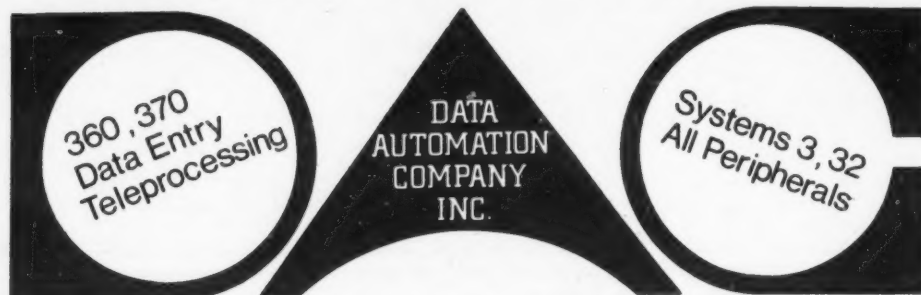
Most models avail. for 3rd
Quarter delivery.

3277's

Most keyboards, remote and
local controllers available.

IPS Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

PIONEERS IN THE USED COMPUTER INDUSTRY

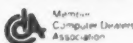


4858 CASH ROAD • DALLAS, TEXAS 75247 • AC 214 • 637-6570

MAJOR DEALER IN USED COMPUTERS ALL SYSTEMS & PERIPHERALS

IF YOU ARE RETURNING RENTAL CREDIT
EQUIPMENT TO IBM WE CAN SAVE YOU
FREIGHT AND MAKE YOU MONEY!

The
Professionals



BUY - SELL - LEASE - BROKERAGE

Let the
"NATIONS LARGEST WHOLESALE DEALER"

Buy, sell, lease, sub-lease, or be your agent in placement
of your pre-owned IBM 360/370/System 3, or other units

COMPUTER INTERNATIONAL, LTD.

CWC's international division -
experts in foreign markets, freight, customs.

BEACH COMPUTER CORPORATION, CWC's Leasing Division

COMPUTER WHOLESALE CORP., (504) 581-7741
SUITE 507/508 FIRST NATIONAL BANK OF COMMERCE BLDG.
NEW ORLEANS, LOUISIANA 70112



MEMBER OF COMPUTER DEALERS ASSOCIATION

3340 B2

3350 A2 A2F B2 B2F

Large quantities available now.

3830-2 Control units also available

Sale or lease

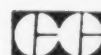
Call Bob Bardagy
COMDISCO (312) 698-3000
or your nearest COMDISCO office.



370/125's

For Sale* Lease* Purchase
*Purchase Leaseback

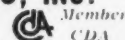
Specialists in 125 Systems
Also All Peripheral Units



CORPORATE COMPUTERS, INC.

(203) 661-1500

115 Mason St., Greenwich, CT 06830



LEASING?

YOUR

168, 158, 148, 145, 138 OR OURS

- We'll write a short-term
or long-term lease — on YOUR
system or OURS
- We'll configure a total system
or part of one to your specifications

Our leasing concepts are sensitive to your needs



**COMPUTER
CAPITAL
CORPORATION**

1351 WASHINGTON BLVD. STAMFORD CT 06902
203-357-9663

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

FOR SALE OR LEASE

IBM 3277-2's with
4630 Keyboards
90 Day Delivery
Call Collect or Write
1975 Hempstead Tpk.
East Meadow, N.Y. 11554
(516) 794-9722

Berlent Industries, Inc.



PDP 11/45

FOR SALE

RF-RS
2-RP03
2-TU10
256 KB + CACHE
1800 LPM Printer

3 years under
DEC maintenance

COMPUTER RESOURCES

(303) 771-8930
5680 South Syracuse Cr.
Englewood, CO 80110



Mini-Computer Brokers

DEC SPECIALS

11/45 64KB

11/34-DM to 256KB

RK05=AA

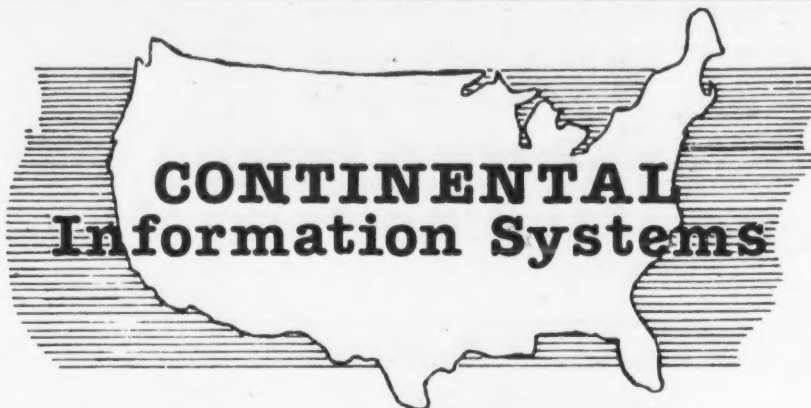
MS11-JP

DL11-A-B-C-D-E-W

Spare Processor Boards
Immediate Delivery

SEVCO, INC.

22 Karal Drive
Framingham, MA 01701
(617) 879-8187



CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

168 L - 8 Channel - June/July

165 K - DAT available - June

158 U33 - August

158 AP - new - June

155 J2 - June

145 I2 - June

135 -384K - June

158 INTEL Memory - 2 MB - July

168 - Memory - July

We also have new 168, 158, 148, and 138 Systems in July

Call Us!

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell
Wanted:

3330's, 3340's & 3420's



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

Before you buy or sell used computer
equipment consult

COMPUTER PRICE GUIDE

"The Blue Book of Used Computers"

Quarterly publication contains current
price information about used IBM
computers and peripherals. Includes
newsletter about current price trends
and availabilities.

\$5 per issue - \$18 annual subscription

Computer Merchants Inc.

75 South Greeley Avenue, Chappaqua, New York 10514
Member Computer Dealers Association (914) 238-9631

SALE ALL IBM Unit Record Equipment
129 & 029's
East Coast (717) 564-8870
West Coast (415) 332-6265
(714) 754-7823
Unit Record Leasing Company
110 HiVista Road
Sausalito, Calif. **LEASE**

MINICOMPUTERS & SYSTEMS

Don't waste company time or
money. Check with us before you
buy or sell.

**New DEC Equipment
Immediate Delivery**

RK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off
list
DZ 11
DEC Station 78

**New DG Equipment
Immediate Delivery**

DG 10 Mbyte Disk Systems from
\$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list
Immediate delivery for MOS!

Inventory Clearance
call us for free brochure

MINICOMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3

AND PERIPHERALS

WE BUY • SELL • LEASE • TRADE



P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

BUY • SELL • LEASE

IBM 029's - 129's
3277's - 3741's - 3742's
Peripheral Equipment

026 - \$ 800 088 - \$2500
059 - 1375 514 - 800
082 - 800 519 - 950
083 - 1800 548 - 1500
084 - 2500 582 - 900
085 - 750 587 - 2800

MOHAWK-6401-6403 • NCR-736
COMPLETE LINE BUSTERS, SHREDDERS,
DECOLLATORS AND BINDERS



5505 N MENARD AVENUE, CHICAGO, ILLINOIS 60630

IBM 158 Attached Processor Unit AVAILABLE JULY, 1978

Contact: Jerry Borisy
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

AVAILABLE FOR OPERATING LEASE

3420-6's inc. dual-now
3420-8's inc. dual-now
3803-2 inc. 8100-now

FOR SALE OR OPERATING LEASE

3411-3 inc. 138, 360 feature, dual-now
3410-3's inc. dual-now
3411-1 incl. Sys 3 feature, dual-now
3420-3's single
3610-4's document printers-now
3611-A02 passbook printer-now

WANTED TO PURCHASE

3168-4 MEG
3803-1 or 2

CALL: (203) 324-9495

STAMFORD COMPUTER GROUP, INC.
927 Westover Road
Stamford, Connecticut 06902

FOR SALE OR LEASE

370/168

AVAILABLE JUNE '78

(MODEL 1, 3 or A)

Bob VanHellemont

CMi CORPORATION — (313) 642-8000

**PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS**

Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie

SYSTEMS MARKETING, INC.
200 E. Thomas Road
Phoenix, Arizona 85012
(602) 264-3600 Telex 667-334



**efm computer
leasing, inc.**



3000 marcus avenue
lake success, ny 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40	360/65
360/50	370/135
	370/145

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Short-Term Lease:**370/165** with/without DAT

Model	KJ	K
Serial	60103	60205

An ideal interim solution for users who require more processing power while waiting for their 303X. Available from CSA on very attractive short-term lease basis.

Call Marilyn Glazer at 1-800-225-2036

CSA

Computer Systems of America Inc.
141 Milk Street, Boston, Ma. 02109
(617) 482-4671

CSA is a private lessor and lease underwriter with a portfolio of \$300 million-plus of computers under lease to the world's largest corporations.

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6
Systems 32 & 34
All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372 2622

Member CDA

FOR LEASE

370/145 Interim to 3031

370/145

Available June, 1978

(# 10597)

3031

(P.O. # 526180)

Available August, 1979

Call Anne Rhame

(804) 643-9123

CCA COMMONWEALTH
COMPUTER
ADVISERS, INC.

**NEW DG NOVA 3/12's**

WITH BATTERY BACKUP AND
AUTO PROGRAM LOAD
AND RESTART
NEW DG MEMORY
32 OR 16 KB

IMMEDIATE DELIVERY WITH
22% DISCOUNT

CALL CLARK & ASSOC.
(816) 741-3183

FOR SALE**BURROUGHS****B1700 SYSTEM**

SAVE 50%

E1714 CPU 64K, 130 MEG Disk,
400 LPM Drum, 96 Col Reader/
Punch, under maint. Contract. 2
PC920 Data Recorders also Avail.

DENNIS CHATFIELD

312-439-1150

FOR SALE**HONEYWELL****3200****COMPLETE****SYSTEM**

16 702A Keytapes
6 760 Communicators
3 715 Printers

5 ICC 24LSI Modems
1 083 Sorter
1 548 Interpreter
4 024 Key punches
3 056 Verifiers

Call or Write:

Tony Anderson

Houghton Mifflin Co.

Wayside Road
Burlington, MA 01803

617-272-1500

DATALEASE***SUPER SAVER SPECIALS**

•ALL NEW• •ALL GUARANTEED•

DEC**RK11D Controller RX11BA & RXV11BA****\$2250⁰⁰****DEC**

Dual Floppy

\$2995⁰⁰**DEC****DR11B**

Direct Mem. Acc.

\$975⁰⁰**DEC****MM11DP**

11/34 Memory

\$1750⁰⁰**DEC****VT100 CRT****\$1449⁰⁰****RK05F - \$3950⁰⁰****11/60 K-AA cpu**

32 kw.

DL11W - \$475⁰⁰**\$18,000⁰⁰**

*ALL SUPER SAVER PRICES ARE BASED ON CASH WITH ORDER OR C.O.D. EQUIP. IS GUARANTEED ELIGIBLE FOR DEC MA UPON PROPER INSTALLATION BY DEC. RETURN TO DATALEASE FOR EXCHANGE OR REPAIR UP TO 60 DAYS FROM DELIVERY. OFFER SUBJECT TO SUPPLY ON HAND.

MISCELLANEOUS:**DH11AD****KE11E****DL11A, B, C, D, E****KE11F****DL11W****KT11C****DR11B****KT11D****DR11C****M7259****DR11K****M7260****DU11DA****M873-YB****DZ11A****M920****DZ11E****M930****FP11C****M9301-YA**

For fast delivery and substantial Savings\$

CALL the DATALEASE Digital HOTLINE**800-854-0359****DATALEASE**

700 No. Valley St., Ste. A, Anaheim, California 92801

(714) 533-3920**Telex 692439****For Sale Or Lease****System 3/15****Complete Systems**

- SHORT OR LONG TERM
- CONFIGURED TO YOUR NEEDS
- WITH OR WITHOUT PERIPHERALS

Any configuration from B19 to D24
30 to 90 days delivery
Also complete inventory tapes — disks.
Printers — CPU Upgrades

CDB FINANCIAL, INC.

8035 East R.L. Thornton Freeway Suite 309
DALLAS, TEXAS 75228

(214) 324-3491

**IBM PERIPHERALS
FOR SALE OR LEASE**

- 2501/B2 June
- (2) 2314/1 w/airline June
- buffer August
- 3505/B2 & 3525/P1 June
- 3286 Printers June

WANT TO PURCHASE

- 3333 and 3330 Model I & II
- 3277 Model 2 Display Stations

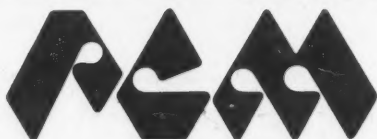
Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Dealer &
Lessor In IBM
Computers

Forsythe/McArthur Assoc.
919 N. Michigan Ave.
Chicago, Ill. 60611

Member Computer
Dealers Association**BUYING SELLING LEASING**

360/40	370/145	370/135
360/50	370/158	370/155
360/65	370/168	370/165

TAPES/DISKS/CORE

Pioneer Computer Marketing

1165 Empire Central Place Dallas, Texas 75247

214/630-6700

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

370's

-125G — 4501, 4662, 4667, 4668, 4680,
4685, 1403, 3569, 3525, 4675

-125G — 4505, 4662, 4667, 4668, 4692,
5248, 4675

-135GF — 4640, 4650, 4722, 4723, 6981,
6982, 7855, 7881, 4724, 3215,
3046

-135GF — 4640, 4722, 4723, 4724, 6981,
7855, 7861, 7862, 3215, 3046

FOR SALE OR LEASE

CALL: BOB SHANEY
(313) 322-7482

WRITE: FORD MOTOR CREDIT COMPANY

P.O. BOX 1729
DEARBORN, MICHIGAN 48121



We encourage your inquiry about our unique
programs for both purchased and leased equipment.



AVAILABLE FOR LEASE OR SALE

CPUs	3125-GF	Short Term Lease	Now
	3135-H		9/15/78
	3145-I2		9/15/78
	3145-J2		9/5/78
	3158-U34		12/1/78
	3158-K		12/15/78
TAPES	3411-3		Now
	3410-3		Now
	3420-3SD		Now
			Now
I/O	1403-N1	With UCS	9/15/78
	1403-N1		Now
	2821-2		9/15/78
	2501-B1		9/15/78

End Users: If you are returning CPUs or peripherals to IBM, let us buy them with your POCs. Your Company will benefit.

Contact: Bob Applegate



Member
Computer Dealers
Association

FINALCO
Computer lease underwriters and asset managers
8150 Leesburg Pike • Vienna, Virginia 22180
(703) 790-0970

FOR SALE

3275-2 Display Stations
3286-3 Printers
3284-3 Printers
2821-3 Control Unit
3350-B2F Disk Storage
2365-2 Proc. Stor

WANTED

3033 4th Quarter
Call or Write
(714) 833-9800
TWX 910-595-2550
SADDLEBACK
MARKETING CORP.
1401 Dove St., Suite 245
Newport Beach, CA 92660

303X Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

dataserv

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440



buy • sell • lease • trade

370
CPUs
System
Memory

115-138

Steve
Lacny

370
CPUs
Memory

145-148

Jim
Myers

360
Memory

M. J.
Dorsey

CPUs
Peripherals

360

Neal
Johnson

Returning Equipment to IBM?

Before you send any of the following machines back to IBM, call us. We'll show you how to make money using your rental credits.

CPUs	Disk	Tape	I/O
3115	3330	3410	1442
3125	3340	3411	2501
3138	3344	3420	2821
3148	3350	3803	3505
5415	3830		3525

CPUs
Peripherals
Memory

sys13

Models 6-15

System

32-34

Mary
Cronan

Tape
Disk
3270's

370
Peripherals

Tom
Anderson

3741-42

Becky
Ernst

Certification Specialists

Disk Packs Data Modules

Bought - Sold - Traded
tested refurbished
Contact

Rick Hubata, Sales Director

Systems Supply Corp.
833 W. Jackson Blvd.
Chicago, IL 60607

(312) 421-2900

LOWEST PRICE EVER!

MEMOREX

Diskettes
100% Error Free
IBM Compatible

\$2.89 Ea. Bx of 10

Limited Time Offer
TAB OF CENTRAL FLA.
P.O. Box 1056
Winter Park, FL 32790
(305) 628-4429

FOR SALE OR LEASE IBM 360 EQUIPMENT

- 360/30 3ch.-512K June
- 360/65 1.5 Meg Fabritek July
- 2365/2 June
- IPC 6780 July
- 360/50 IBM Memory (256K to 512K) June

Call

FORSYTHE
McARTHUR

(312) 943-3770

Dealer &
Lessor in IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave. Chicago, IL 60611

BUY

Surplus DEC And Data General Hardware

SELL

PHIL THOMAS

For Sale

(305) 272-8753

Thomas Business Systems, Inc.

TIGER COMPUTER

415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500



A TIGER INTERNATIONAL
COMPANY

SHORT AND LONG TERM STRAIGHT WALK-AWAY LEASES THAT'S RIGHT!

Tiger does not require our customers to guarantee any residual value or find qualified sub leases at the end of the initial term on the equipment.

370/138, 148, 135, 145, 125
370/158's 168's and Peripherals
IBM Series-3031-3032-3033

WE BUY/SELL & SUBLEASE
ALL IBM 370 CPU's & I/O

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap	
IBM 370 MEMORY FOR SALE 370/145: IBM Memory H ₂ to I ₂ 370/135: IBM Memory - All Sizes FE/GD GF/H FE/H GD/GF H/HG H/I GF/DH HG/I Etc. 370/145: CDC/Intersil 256K to 768K Memeox/Intersil 256K to 1 Megabyte 370/135: Several units, including Memorex, CDC, Intel & CIG. Various capacities to add 128K to 384K additional memory. CALL DICK BAKER (305) 561-5207 dataware Incorporated <small>Intracoastal Building 3000 NE 30th Place, Suite 309 Fort Lauderdale, Florida 33306 Telephone (305) 561-5207</small> MEMBER CDA		DEC HARDWARE PDP11-PDP8 LSI-11's Processors Peripherals Memories VT52's LA36's LS120's LA180's <small>Also available Other printers and discs available with controllers for most minicomputers.</small> NATIONAL DATA SALES CORP. 516/944-7444		FOR SALE OR LEASE <ul style="list-style-type: none"> 370/135 H w/IFA, IFA, August ICA, s/n 61514 June 360/65 CPU Upgrade (1 to 1H) WANT TO BUY <ul style="list-style-type: none"> 370/138 J w/IFA & IPA Sept 370/145 I2 or J2 w/ISC Nov Call FORSYTHE McARTHUR (312) 943-3770 Forsythe McArthur Associates, Inc. 919 North Michigan Ave., Chicago, IL 60611 Dealer & Lessor in IBM Computers Member Computer Dealers Assoc.	

AVAILABLE FOR SALE OR LEASE

QTY.	EQUIPMENT	AVAILABLE
1	2501 B1 or B2	Now
2	3333-11 w/8150	July 1
2	3330-11	July 1
3	3271-2 w/3250	June/July

WANT TO BUY

3420	Tape Drives
3803	Tape Control
3277-2	Display Stations

CALL OR WRITE:

NP Computer Sales & Leasing Corp.

 1211 W. 22nd Street
 Oak Brook, IL 60521
 (312) 920-8181

Member Computer Dealers Association

370 SYSTEMS REQUIRED FOR PURCHASE

dpf

DPF has requirements to purchase:

 370/135, 145, 155, 165, 158, 168
 and peripherals
 for our lease portfolio

 Call: Norman Usher (914) 428-5000
 DPF Incorporated
 141 Central Park Ave. So.
 Hartsdale, N.Y. 10530

FOR SALE OR LEASE

AVAILABLE IMMEDIATELY

 370/155 ANY MODEL w/o DAT
 370/155 MEMORY UP TO 2 MEG
 IBM.CMI.AMS.AMPX


COMPUTER INSTALLATIONS CORPORATION

 5514 Caroline Street
 Houston, Texas 77004

713-524-8249

 WANTED TO BUY
 DAT
 ORDER POSITION
 FOR 370/155

370/155 • ANY MODEL

 PLEASE CONTACT:
 HARRY BLAIR

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

July Special—Order now and 2000 bps

SAVE 70%



over original price on this 2000 bps modem

Modem 2200/20 is a 4-phase synchronous data set which can be used over long distance dial-up (DDD) or dedicated telephone lines at 2000 bps. The special price for July is \$525; this is 13% under our everyday low price of \$600, and 70% below the original price of \$1780. A typical 30-month lease rate would be \$24/month.

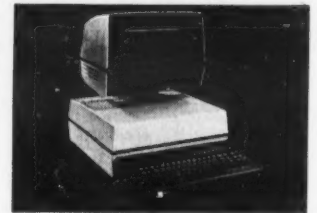
The 2200/20 operates in full duplex, simplex, or half duplex modes. The unit is compatible with ICC's 20 LSI and WE 201A data sets.

Offer expires July 31, 1978.

Conditions of Sale

- 1) Orders must be postmarked prior to July 31, 1978 with delivery scheduled no later than October 1, 1978.
- 2) Offer subject to availability of products.
- 3) All prices are F.O.B. Miami Florida and do not include installation.
- 4) Based on Racal-Milgo Terms and Conditions.

40+TK1 Data Station



The 40+TK1, a high speed direct dial data station, is now available through our Special Offer Division.

The 40+TK1 stores messages in an MOS solid-state buffer and is designed to replace low-speed, leased-line and tape oriented terminals. (Note: The 40+TK1 can be used as a Wiltek replacement.) Data transmission speeds range from 1200 to 2400 bps over dial up lines. The data station includes an ICC 40+ display station, keyboard, control module, printer and desk—all for the introductory price of \$7,950 (original price was \$14,000).

Typical Savings

Original Price

Special Price

2400 bps



MODEM 2200/24

Half or full duplex operation over dial or dedicated facilities.

\$1780

\$60/mo.*

\$725

\$29/mo.*

3600 bps



MODEM 3300/36

Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up.

\$3620

\$85/mo.*

\$950

\$38/mo.*

4800 bps



MODEM 4400/48

For point-to-point synchronous operation. Operates full duplex or simplex over typical unconditioned lines.

\$4800

\$70/mo.*

\$995

\$40/mo.*

7200 bps



MODEM 4800/72

Dedicated line with optional multipoint operation for up to three 2400 bps channels.

\$6900

\$165/mo.*

\$1995

\$80/mo.*

9600 bps



MODEM 5500/96

Dedicated line with optional multipoint operation for up to four 2400 bps channels.

\$7990

\$185/mo.*

\$2995

\$120/mo.*

Prices apply to sale or lease in U.S. only. *Based on 30 month lease

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166

Reserve now. Phone collect (305) 591-5535 or send this form.

Racal-Milgo

— the new name for ICC

 I want more information about
 your Special Offer Division
 products.

☐ Yes, I am interested in the July special.
 Please send order form and data sheet.

☐ Purchase ☐ Lease Quantity _____

☐ I'm interested in the following:

Product	Quantity

☐ Purchase ☐ Lease

Name and Title _____

Company _____

Street _____

City _____

State _____

Zip _____

Phone No. _____

☐ Please place me on your mailing list for future specials.

CW6/26

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

America's Leading Companies Depend on us.

Buying · Selling · Leasing
Purchase/Leaseback

3277 3803 3286
3272 3420 3284
3340 3330 3830



Call us on IBM Rental Credits. We buy your credits on
FTP, ETP and MAC equipment.

Contact: Bob Haggerty 203-438-9567 or Charles Pratt 214-361-8337

R. K. Enterprises, Inc. 470 Main St. Ridgefield, CT 06877
Marketing Centers: New York, Dallas, Atlanta, Cincinnati, Los Angeles

WANTED TO BUY

BASIC/FOUR
DISC DRIVE

2324-200 / 10 MB
Contact: Ken Smith

R.O. Hull & Co., Inc.
3203 West 71 St.
Cleveland, OH 44102

(216) 651-7300 Ext. 260

145/3031 Lease

370/145 (#10597)

Available 6/78

3031 (P.O. #52618U)

Available 8/79

Call Anne Rhame
(804) 643-9123



COMMONWEALTH
COMPUTER
ADVISERS, INC.

Datapoint

6600

Processor and disk controller, 2
Datapoint disk drives, 1 Data-
point multiplexer all for \$53,200.
Also, 1 Datapoint 600 line printer
for \$13,300. ADCON Corporation,
100 Main St., Hackensack,
N.J. 07601. (201) 343-2770.

WANTED

SYS 3/15

B or D w 1402 N1
Immed. Purchase by
END USER
CALL E. GREENE

(212) 725-0210

We Buy & Sell Honeywell Mini Computers

Best Prices Anywhere On
H316, H516, and H716
Computers & Peripherals
Pac Repair, Memory
Repair & On Call
Maintenance Also Available
Call or Write:
Don Boudreau

Boudreau Consulting

P.O. Box 304
Pope Industrial Park
Holliston, MA 01746
617-429-2811

AVAILABLE IMMEDIATELY

IBM
370/138

Memory
I-J-512K

CONTACT: Pat Milton
(214) 630-6700

Pioneer Computer Marketing



LEASE

Short or Long Term
ISS 3330 mod 1
equivalents

RANDOLPH COMPUTER COMPANY

537 Steamboat Rd.
Toll Free: 800-243-5307

Greenwich, CT 06820
Conn: 661-4200

Available For Sub-Lease

370/148

Randolph Computer Co.

(800) 243-5307

(Conn) 661-4200

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE

3135-H with 4655, 6981, 7861, 3215

Delivery 8/78

3145-HO with 512K Add-On CMI Memory

Delivery 5/78

3155-J with DAT Box—Delivery 7/78

3158-K—Delivery 6/78

3158-K—Delivery 8/78

3158-U34—Delivery 8/78

3031 Lease—Delivery 10/78

WANT TO BUY

3145-J2—Inst. 7/78

1442-N2
2821-1

3830-2
2880-2



**COMPUTER
INDUSTRIES
INC.**

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO — 312/298-5650
WASHINGTON — 301/229-7200
LOS ANGELES — 213/370-4844

-- FOR SALE --

DATA GENERAL EQUIPMENT

Quantity Available	DESCRIPTION	LIST Price/Unit	C.S.S.C. Price/Unit
1	Nova 2 with 32KW Core Mem, APL, P/M	\$10,800	\$5,900
1	Nova 800 Jumbo 16KW Core Mem, APL, P/M	12,850	6,900
1	Nova 3 Expansion-Chassis	2,000	1,700
1	Nova 3 32KW MOS Parity Memory	7,400	5,500
6	Nova 800 8KW Core Memory	3,200	900
6	Nova 800 4KW Core Memory	2,500	450
1	Keronix 8KW Core Mem. for Nova 1200	1,400	950
1	4007/10 Basic I/O	350	300
2	4062 EIA Multiplexor	1,500	900
2	4063 Current Loop Multiplexor	1,500	900
2	4026/27 16-Line EIA Modem Control & 4052A Cable for 6062	1,550	925
2	4051 Junction Panel (with 4052A Cable)	700	400
1	6042 Ocps Dasher	2,400	2,000
1	ADM-3 CRT	995	500
1	Infoton Vista CRT	—	900
2	Teleray 3500 CRT	1,300	800
2	Teleray 3300 CRT	1,200	800
2	Systems Industries Diablo Disc Cntrlr & Formatter (config. for DG computer)	—	1,500
1	Digi-Data Mag Tape Drive	2,400	1,000
1	5 ft. Computer Cabinet	—	200
1	5 ft. Computer Rack	—	100
2	4239 2.5 MB Disc Drive (Diablo 31)	6,000	1,950
1	ASR-33 Teletype	—	700

COMPUTER SYSTEMS SUPPORT CORP.

9112 Gaither Road
Gaithersburg, MD 20760
(301) 424-7870

BUY·SELL·LEASE·TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today
to these representatives!

SYSTEM / 3
All Peripherals
call Gene Nicholl

370's
All Peripherals
call Don Norris

SYSTEM 32's, 34's
3270 CRT's
call Marilyn Morris

360's
All Peripherals
call Duke Crumpton

129,029 KEYPUNCHES
Unit Record Equipment
IBM M/A
call Abe Salih



(214) 634-2750

TWX 910-861-4171

METROPLEX COMPUTER COMPANY, INC.

7135 John Carpenter Freeway
P. O. Box 47220, Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer



When you plan to buy or sell your computer equipment...

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.	Home Office New York Chicago Dallas San Francisco	T. A. Takash Dick Ventola Pete Ahern M. W. 'Bill' Tucker Henry Paulson	602-248-6037 914-949-1515 312-298-3910 214-233-1818 415-283-8980
INTERNATIONAL	Canada U.K. Europe Mexico Austro-Asia Eurasia Dallas	Don Maunder Joe Gold Andres Contreras John Hallmark Don Haworth John Hallmark	416-366-1513 022-61-27-54 905-543-6850 214-233-1818 214-233-1818 214-233-1818
NON IBM			



GO GREYHOUND

Greyhound Computer Corporation

Greyhound Tower, Phoenix, Arizona 85077

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

We encourage your inquiry about our unique programs for both purchased and leased equipment.



We Want to Buy

CPU 3125-HG2 7/1/78
Channel 2850-1 (168) Now

PERIPHERALS 370 Memory, tapes,
disk and I/O

End Users: If you are returning CPUs or peripherals to IBM, let us buy them with your POCs. Your Company will benefit.

Contact: Bob Applegate



Member
Computer Dealers
Association

Computer lease underwriters and asset managers
8150 Leesburg Pike • Vienna, Virginia 22180
(703) 790-0970

SHORT OR LONG TERM LEASES FROM

dpr

370-30XX Series Upgrade Program

Lease-370 Now, With Guaranteed
Upgrade Rates on 30XX Follow On:
Available on short term leases
immediate delivery
135-145
will configure to suit
and all other
IBM systems

from 360/30's ... to 168's

Call: Mike Swords (914) 428-5000

DPF Incorporated
141 Central Park Ave. So.
Hartsdale, N.Y. 10530

SEND FOR IBM 370 PRICE CHARTS

SALE OR LEASE

135-138

145-148

158-168

SYS/3-15D

WANT TO BUY

3333-3420

158

158J AVAILABLE NOW
3 CHANNEL-ISC
SHORT/LONG TERM LEASE

158-U36 Nov. '78
LOADED-LEASE or SALE

158-A36 1st Qtr. '79
ALL CHANNELS
ALL MADRID'S • 3052 & 3056

AMERICAN USED COMPUTER • 617-261-1100
P.O. BOX 68, KENMORE STATION, BOSTON, MASS. 02215

FOR SALE OR LEASE

IBM 360/30's-32, 64 Immediately
or 128K
IBM 2314-A1 1x4 4/24/78
(lease only)
IBM 3271-2 Controllers 30 Days
IBM 3277-2 Terminals 30 Days

Call Collect or Write

**Berlent
Industries, Inc.**



1975 Hempstead Turnpike
East Meadow, N.Y. 11554
(516) 794-9722

Member
Computer Dealers
Association

3742-1

Dual Data Stations

3270 CRT's

Printers/Controllers

ADTEC

COMPUTER CORP.

280 Madison Avenue
New York, N.Y. 10016
(212) 532-7590

FOR SALE OR LEASE IBM 3420 TAPE EQUIPMENT

- (9) 3420/3 SD & DD June/Aug
- (2) 3420/5 DD August
- (9) 3420/6 SD & DD August
- (2) 3803/2 w/8100, 5210 August
- (1) 3803/1 w/3551 & 8100 August

Call

**FORSYTHE
McARTHUR**

Dealer &
Lessor in IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES, INC.
919 North Michigan Ave., Chicago, IL 60611

FOR SALE

Available August 1978

370/135 GD
W/3215-1, 3046-1
Features-4655, 4457, 6981,
7855, 7861, 3900, 3905
ALSO

RENTAL RETURN

370/138 I
W/3286-2, 3046-1
Features - 4655, 4457, 445
Contact: Mr. Huddleston
(518) 458-7666
CHART, INC.
20 Computer Drive West
Albany, N.Y. 12205

FOR SALE Burroughs

1-B 3500-240K
16-TU 756-
Teller Terminals
8-DC 140 - Commun.
Controllers
11-TC 737 - Teller
Terminals
20-TA 783 Modems

Available August 1, 1978
Contact: *

Hendrik Kranenburg

HIBERNIA BANK

1750 Alameda St.
San Francisco, CA 94103
(415) 565-7143

AVOID THIRD PARTY/BROKER FEES

370/168 K J

WITH:

ISC
Buffer Expansion
(2) 2880-2
(1) 2870-1
3066-2

BLK MPLXRS
BYTE MPLXR
3067-2

TERM:

Sale or Short/Long Term Lease

AVAILABLE: December 1, 1978

CONTACT:

Gary H. Golub
(305) 858-4671
2850 Tigertail Ave.
Coconut Grove, FL 33133

TIME & SERVICES

COMPUTER TIME FOR SALE
LOCATION

NORTHERN NEW JERSEY

IBM 370/148 1 MEG WITH:
6-3340 Fixed Head Disk Drives
3-3420/Mod 7 Tape Drives (320KB)
1-3505 Reader 1100 CPM
1-3525 Card Punch 300 CPM
1-3203/Mod 4 Printer 1200LPM
2-3277/2 CRTS

DEDICATED OR PARTITION
TIME AVAILABLE

FOR FURTHER INFORMATION
CONTACT (201) 488-4200 Ext. 47



Our product is Hardware Support Services...

Are You Interested?

At TTS, we're building a reputation of reliable service worldwide with a team of highly skilled Field Engineers providing support services to the industry. Our organization is a 'people company' built upon specialized expertise and training. Perhaps you are one of the people we're looking for.

FIELD ENGINEERING

- Senior Support Specialist... 360/370 Systems
- Senior Customer Engineers... 360/370
- Customer Engineers

TTS is also looking for Field Experienced CE's interested in becoming instructors.

HARDWARE INSTRUCTORS

- Large 370 CPU's
- 360/370 I/O Instructors
- Digital Electronics
- Mini/Micro Systems

At TTS, our strength is in our people and our growth potential is in our ability to attract them. Call TTS today for more information. Immediate openings in Europe and in the Midwest U.S.A.

TOTAL TECHNICAL SERVICES

(216) 237-8363

13405 YORK ROAD, NORTH ROYALTON, OHIO 44133

time & services

software for sale

software for sale

software for sale

software for sale

WE ARE BROKERS OF COMPUTER TIME

New York & New Jersey Out-
Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

COMPUTER TIME

RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 15511

- 360/30
- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH

P.O. Box 67
Route 202
Raritan, N.J. 08869

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI,
Data Craft, Data General, CDC,
DEC, EMM, Fabri Tek, Honey-
well, GAI, HP, Interdata, Lock-
heed, Plessey, NCR, SMI, Univac,
Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming Watslines
- Complete systems and software support
- Full application Library (including all accounting applications)
- All high-level languages
- Prime time and off hours
- VS-2, HASP, INTERCOMM, ROSCOE
- Complete data security including off-site storage

For information
call John MacDougall
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago Illinois 60601

DEC 11/70

RSTS/E

TIMESHARING

\$4.00 HOUR

Servicing Md. & Va.
All Programming & Lngs.
Software Packages for
Payroll, Accts. Recv.
and Payable, Inventory,
etc. Data Base Services

OCEANIC ENTERPRISES INC.

201 N. Charles St.
Baltimore, MD 21201
(301) 685-3122

IF YOU ARE CONSIDERING
A FUTURE WITH

MVS

AND THE BENEFITS OF
INTERACTIVE TIME
SHARING UNDER

TSO

YOU CAN HAVE IT NOW,
WITH

TONE 3

THE LOW OVERHEAD-
HIGH PERFORMANCE
TIME SHARING SYSTEM

FOR

VS1

DESIGNED TO CONFORM
TO THE STANDARDS OF

IBM

WRITE OR CALL
FOR DETAILS

TONE

11588 Trask Avenue
Garden Grove, Ca 92643
(714) 636-8501

RSTS/E

Multiple Terminal Service
Routines written in Basic-Plus allow
you to take advantage of this core-
saving RSTS feature without having
to be a software wizard. Series of
subroutines requires only 4K and
has complete user documentation.
Source code and documentation—
\$250.00

Record I/O File Management System

Set of 12 Basic-Plus utilities including
modular sort/merge and record
access subroutines gives the user a
fast, flexible, and simple way to build
files and retrieve data. Access sub-
routines require 4K.

Features include:

- direct access—by record
number or multiple key
(no index required)
- ISAM and hashed access
- sequential processing
- multiple record types in one
data file
- fully integrated
- data independence

Source code and documentation—
\$750.00

Save \$100.00 if you purchase both
systems.

For more information, call or write:

IRI Int'l.
121 Union Street
Providence, R.I. 02901
(401) 272-9800 Ext. 38

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in com-
mercial data processing using
RSTS. Completely on-line, inter-
active systems available for AC-
COUNTS-PAYABLE, GENERAL-
LEDGER, FINANCIAL-REPORT-
ING, ACCOUNTS-RECEIVABLE
and PAYROLL applications.

These are consolidating pack-
ages and support multi-division
company and multi-company cor-
porate accounting functions.

If you are installing or have in-
stalled a Digital Equipment Cor-
poration RSTS/E or CTS-500 sys-
tem, contact us for cost-effective
solutions to your core accounting
problems.

Plycom services, Inc.

(219) 935-5121
P.O. Box 160
Plymouth, IN 46563

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems

P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

ON-LINE BURROUGHS COBOL TEXT EDITOR

The Most Advanced
in the Industry!

- CREATE new source pro-
grams
- UPDATE source programs
- COMPILE source programs
- RESEQUENCE source files
- MERGE incorporates source
file(s) into another source file
- SIMULATE a remote SPO

Years in development and testing,
the Ozomega Text Editor offers
incredible flexibility and proven
time savings capability. Inter-
active sophistication well beyond
anything on the current market.
Will function on all Burroughs
medium system computers (fixed
head/disc pack) and works in con-
junction with the TD820 and
TD830 terminals.

- Eliminates keypunching
 - Minimizes scheduling prob-
lems
 - Reduces operations
 - Optimizes staff resources
- Complete User's Manual and de-
tails instructions for purchase of
source tape, now only \$18.

OZOMEGA SERVICES, INC.

P.O. Box 6844
Louisville, KY 40206

PROVEN Packages from Professionals

LARGE COMPUTER SYSTEMS — for users of IBM, BURROUGHS, DEC, HONEYWELL, UNIVAC and ICL computers.

- Financial
 - General Ledger and Financial Reporting
 - Accounts Payable
 - Accounts Receivable
 - Fixed Asset Accounting

- Manufacturing
 - Material Requirements Planning
 - Master Production Scheduling
 - Capacity Planning
 - Shop Floor Control
 - Purchasing

Comprehensive Report Generator — FILETAB

SMALL COMPUTER SYSTEMS — for users of System/3 and other IBM, Burroughs, Univac 9030, Honeywell 62, HP 3000, DEC, Interdata and most popular business minicomputers.

- General Ledger and Financial Reporting
- Accounts Payable
- Accounts Receivable
- Fixed Asset Accounting

SOFTWARE INTERNATIONAL®

Elm Square, Andover Mass 01810 (617) 475-5040

Atlanta • New York • Washington D.C. • Philadelphia • Chicago

San Diego • Toronto • Houston • Columbus OH • San Francisco

CW6-78

Get all the details. Today.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____ Computer _____

Accounts Payable and Purchase Order System

- Three-way match between invoice, receiver and P.O.
- Short and long term cash requirements • Due date and discount calculations • Check reconciliation • Multi-bank capability • 1099 reporting • Duplicate invoice detection • Recurring payments • G. L. interface

From the acknowledged leaders in A.P. and P.O. systems.

IMS

International Management Systems Corporation
4676 Admiralty Way, Marina Del Rey, CA 90291
(213) 822-2022
Contact: John Goetz, V.P. Marketing

MEDICAL/DENTAL BILLING

Complete Billing and Insur-
ance Processing for doctors,
groups and clinics.

- Complete Insurance Forms
- Profile, RVS, ICD-9 Files
- Bal. Forward, Ledger
- COBOL or RPG II
- 30+ users
- 360/370 or mini-computers
- On line, Real-Time or Batch Processing

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

DEC USERS AND OEMs PROVEN APPLICATION SOFTWARE:

- Bill of Material (BOMP)
- Warehouse Distribution System
- Purchase Order Control System
- Accounting Systems
- PDP 8 and PDP 11
- (CTS and RSTS/E)

Write or call:

J. BAKER & ASSOCIATES, INC.

5135 W. Golf Rd.
Skokie, IL 60077
(312) 677-9760

ACCOUNTS PAYABLE

Now a low-cost software package
for mini or mainframe computers
with many cost-saving features:

- Batch processing using single data base for fast processing
 - Modularly structured COBOL programs reduces maint. costs
 - Multi-company facility avoids duplicate software.
 - Flexible retrieval facility for printing reports & more.
- For full details on how our APS software can save you time and money, call (415) 254-1264, write:

LEGLER SYSTEMS CO.
23 Charles Hill Rd.
Orinda, CA 94563

370/158 mod 3 Datacenter

3.5 meg MVS

Specializing in

Remote Job Entry

TSO, CICS, and Batch

IBM 3800 Laser Printer

Very Attractive Rates

Contact: Stu Keriavsky

(212) 564-3030

Datamor

132 West 31 St.

New York, N.Y. 10001

CLASSIFIED ADVERTISING ORDER FORM Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Microcom-
puter Classified Exchange, Time and Services, Software for Sale, Po-
sition Announcements and Buy/Sell/Swap. (Available upon request:
Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN
typewritten copy. Figure about 25 words to a column inch, not includ-
ing headlines.

Cost: Our rates are \$55.30 per column inch. (A column is 2" wide.)
Minimum size is two column inches (2" wide by 2" deep) and costs
\$110.60 per insertion. Extra space is available in half-inch increments
and costs \$27.65. Box numbers are \$3.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established
an account with us), WE MUST HAVE YOUR PAYMENT IN AD-
VANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature _____

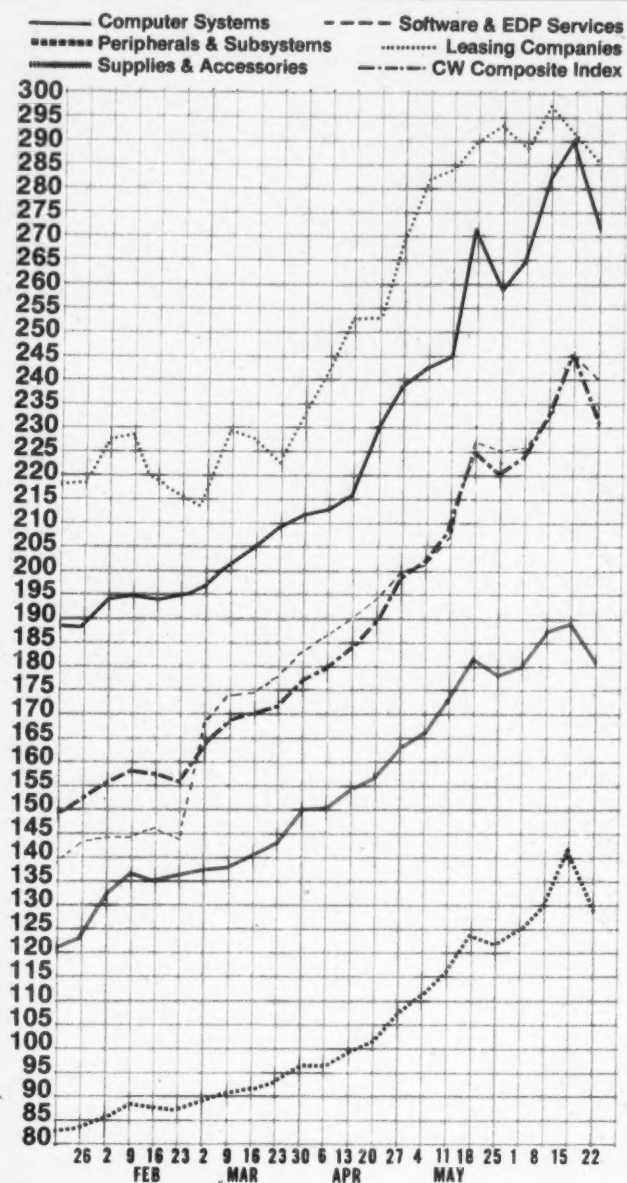
Name: _____

Company: _____ Title: _____

Address: _____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING
COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160



Earnings Reports

DATA DIMENSIONS			
Year Ended Dec. 31			
	1978		1977
Shr Ernd	\$24		\$62
Revenue	11,870,400		7,868,500
Earnings	183,400		479,900

ELECTRONIC DATA SYSTEMS			
Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.39	\$.35	
Revenue	56,964,000	43,352,000	
Earnings	4,936,000	4,436,000	
9 Mo Shr	1.10	.94	
Revenue	156,063,000	115,502,000	
Earnings	13,992,000	11,722,000	

GENERAL DATACOMM INDUSTRIES			
Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.34		\$.18
Revenue	7,509,000		4,728,000
Earnings	531,000		260,000
6 Mo Shr	.64		.32
Revenue	14,008,000		9,007,000
Earnings	992,000		470,000

MODULAR COMPUTER SYSTEMS		
Three Months Ended March 31		
	1978	a1977
Shr Ernd	\$.32	\$.11
Revenue	14,709,000	12,231,000
Disc Op Loss	25,000
Earnings	1,139,000	343,000

a-Restated to reflect discontinued operations.

PERTEC COMPUTER			
Year Ended March 31			
	1978	a1977	
Shr Ernd	\$1.17		\$.78
Revenue	131,802,000		100,664,000
Earnings	7,183,000		4,657,000
3 Mo Shr	.36		.25
Revenue	35,972,000		26,984,000
Earnings	2,192,000		1,514,000

a-Restated.

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Ron Evans
Frank Collins

Account Managers
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
District Manager
Peter Senft
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Judy Milford
Account Managers
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

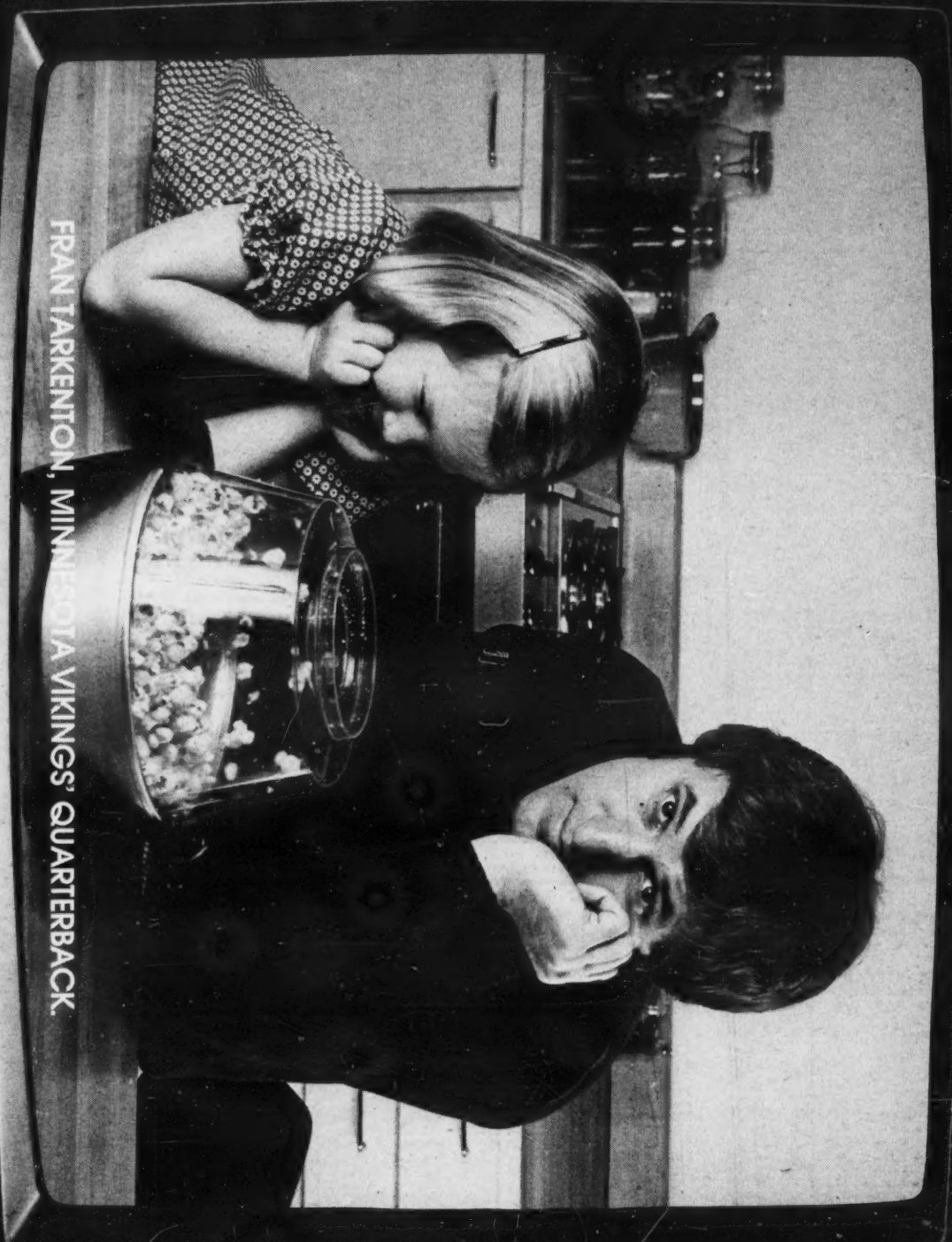
West Germany
Hans-Jürgen Ballnath
CW PUBLIKATIONENS
Friedrichstrasse 31
8000 Munich 40
West Germany
Phone: (089) 34-90-61
Telex: W.Ger-5-215250-HKF

Computerworld Stock Trading Summary

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

<

NOT POPCORN POPPERS, FRAN. PAYROLL.



FRAN TARKENTON, MINNESOTA VIKINGS' QUARTERBACK.

Fran Tarkenton's product isn't popcorn poppers, it's MSA's Payroll Accounting and Personnel Management & Reporting System. No matter how large or small your organization is, how it is structured or how many people are on the payroll, MSA's System will be the solution. And, MSA's System offers complete flexibility in pay periods, tax withholding, deductions, special earnings, automatic bank deposits and reporting.

The MSA Payroll and Personnel Management & Reporting System are integrated to help you meet your government reporting requirements including: EEO/ERISA/OSHA/Affirmative Action.

For more information on our full line of financial software systems, call Carole McConnell at (404) 262-2376 or return this coupon.



THE FINANCIAL SOFTWARE COMPANY
Management Science America, Inc.
3445 Peachtree Road, N.E. Dept. C-1
Atlanta, Georgia 30326
(404) 262-2376
Chicago (312) 986-2450
Los Angeles (213) 822-9766
New York (201) 871-4700
International Agent:
MSA International, Inc.
Brussels, Belgium
Tel. (02) 673.99.63
Telex 63020 Answerback: MSA B

Name			
Company	Title		
Address			
City	State	Zip	
Phone	Computer Model		

I am interested in:

<input type="checkbox"/> Payroll Accounting	<input type="checkbox"/> Accounts Payable
<input type="checkbox"/> Personnel Management and Reporting	<input type="checkbox"/> Accounts Receivable
<input type="checkbox"/> General Ledger	<input type="checkbox"/> Financial Information and Control
<input type="checkbox"/> Canadian Payroll Accounting	<input type="checkbox"/> Supplies Inventory Control and Purchasing
<input type="checkbox"/> ALITAX™	<input type="checkbox"/> Fixed Assets Accounting